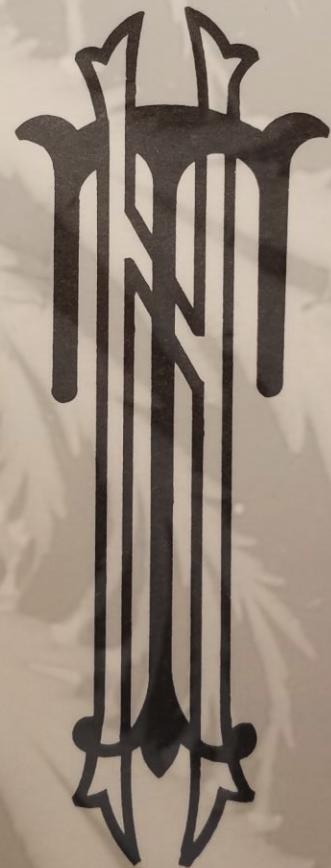


NIKOLA TESLA



Correspondence with Relatives

To my friend Leland
from Ljubo Vujovic
New York
Feb. 6, 1996

PUBLISHED BY

THE TESLA MEMORIAL SOCIETY, INC.

NIKOLA TESLA
CORRESPONDENCE WITH RELATIVES

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Translator Nicholas Kosanovich

TESLA'S CORRESPONDENCE WITH RELATIVES
TRANSLATOR, NICHOLAS KOSANOVICH

PREFACE BY DR. A.S. MARINCIC, DIRECTOR TESLA MUSEUM
BELGRADE

There are about 70,000 letters of correspondence and about 7,000 correspondents. This book contains the original letters to his relatives and those letters received by him-including telegrams. These letters were written during a 60 year period from 1882 to 1942. It is logical that there are about seven times more letters written to him than by him to others. A large number of correspondence to Tesla were from other sources and even up to the present a small number of his descendants gave few copies to the **Nikola Tesla Museum**. Tesla himself did not replicate his correspondence to others.

Most likely the reader will see no replies to letters about interesting questions or discussions from the letters that

can be anticipated by any collection of this type of correspondence. In fact, we should be most grateful that Dr. Tesla preserved all of these letters which were precious memories to him and they were spiritual ties with his sisters and close relatives with whom he corresponded. Undoubtedly, this correspondence had significant historical value to the personal life of Tesla and for a better understanding of his views about human problems and of his close relatives and friends.

A very huge effort was demanded to prepare this collection of Tesla correspondence from the phase of collating, deciphering handwritten letters to preparing documents that enabled us to identify the people in Tesla's family tree of both his father and mother up to the phase of comments and compilation the register of names, geographic locations and correspondence. The workers at the Nikola Tesla Museum deserve a special appreciation of gratitude for its diligent work. A special thanks to **Dubravka Smiljanic** and **Zorica Civric** who is also the **Curator of the Museum**. We would like to remind the reader that this is the first of its kind of anthology in Yugoslavia and the world. The staff prepared it with professional presence and enthusiasm.

This anthology of correspondence was published in the year that was proclaimed "Year of Nikola Tesla in Yugoslavia" and marks the 50th anniversary of his death-one of the great engineers of all time-1993. It is also a significant anniversary--100th Anniversary of the Chicago Exposition where Tesla's polyphase system began its triumphant application to the world. Only 100 years ago electrification of Serbia was introduced in Belgrade 1892. The world was the beneficiary from many of Tesla's inventions; many are still utilized today, and most likely in the future.

Tesla's correspondence in this collection is only a portion of his rich legacy which is in the **Nikola Tesla museum** for posterity. This museum will publish more books in the future. To everyone who assisted in this endeavor-in the first place the Electrical Industry of Serbia and the tireless inspiration and organization by **Radmila Ivankovic** and those engineers, Also the donors who helped fund the cost of this book. We hope that she will be a participant in the next publishing effort by the Nikola Tesla Museum, We owe much to one of the greatest Serb cosmopolites who was an inspiration to many in the past and those in the future.

BELGRADE, JUNE 1993

PROFESSOR DR. ALEKSANDAR S. MARINCIC
BELGRADE UNIVERSITY
DIRECTOR, TESLA MUSEUM

INTRODUCTION

Being a relative of Nikola Tesla and the closest living member on his mother's side , it is appropriate for me to present a brief background which had a maternal influence on Tesla's upbringing that began in Lika then to Budapest and Paris and finally to America. He made his most important discoveries and inventions in the United States

Discovery of Radio, remote control vehicles, fluid turbines, polyphase electromagnetic motors and generators, long distance electrical transmission of power are among the 112 patents approved in 25 countries..

His mother Georgina (Djuka) was the daughter of Rev. Nikola T. Mandic (1800 -1863) and the granddaughter of Toma Mandic (1777-1840). They were respected citizens and landowners in Lika. She had three sisters and four brothers..

Rev. Toma (married to Masa Obradovic); Staka (married to Rev. Djuro Alagic); Trifun (married to Ama-Lina Ristovic, Anka Rabatic and Katarina Japundjic); Marija (married to Pajo Majstorovic) and Smiljana (married to Toma Obradovic).

Tesla's uncles were relatively wealthy in that part of the country.

Pajo was a General Staff Colonel in the Imperial Austro-Hungarian Army. This was quite an achievement for an Orthodox person.. Pajo's son Dr.Milan was a well known lawyer in Budapest. However, Milan's sons Pajo and Petar, became Catholics and Petar visited the USA in 1970 as Count Mandic.

Tesla's uncle Trifun was also a wealthy and well known man who had written his letters in Cyrillic Serbian and signed them (they are in my possession). He was a hotelier and landowner.

Trifun, Tesla's second uncle was a well known hotelier and I have letters attesting to this fact. Trifun had three daughters (Beta, Olga and Sofija) and two sons Dr. Petar (1877-1951) who was a well known lawyer in Mostar. The other son Very Rev. Milos (1880-1941) was the Prelate of Lika indicating Trifun's appreciation for education. Dr. Petar's sons Dr. Branislav (1913-1972) completed Law school in Berlin. His other son, my father Vojin (1911-1992) was a graduate of the Sorbonne in Paris. Dr. Petar's oldest daughter finished Philosophy in Geneva Switzerland.

His third uncle, His Eminence, Archbishop of Sarajevo and Metropolitan of Bosnia, Nikolai(Petar-before becoming a priest) together with Col. Pajo and Trifun shared the expenses for Tesla's education in Europe and his expenses for a trip to the USA.

Since Tesla's father Rev. Milutin Tesla was a small parish pries with a low income, the cost of Nikola Tesla's education was supplied by his three uncles-Palo, Trifun and Nikola.

It was often mentioned and claimed that Tesla came to America with a few dollars or cents in his pockets. This is inconsistent with the stories of my grandfather. Tesla was involved in gambling during his youth prior to his departure to America.

His father and uncles had well stocked libraries that helped Tesla learn more as an autodidact than as a formal student in school.

He inherited his inventive proclivity from his mother Djuka, a woman of extraordinary ability. She loved poetry and memorized many poems, not only from her native Serbian language, but, , from all over the world. Serbian poetry was very musical and she would recite while doing chores and young Nikola would listen.

Djuka (1822-1892) had an inventive mind. She had come from a family of inventors. Her father Nikola and her grandfather Toma had inventions to their credit. Tesla marveled at his mother's ability to create new implements out of scrap material. He often said that his mother's ability to create influenced his life as an inventor.

Tesla had said that his mother was an inventor of the first order and would < I believe, have achieved great things had she not been so remote from modern life and its multifold opportunities. She invent and constructed all kinds of tools and devices and wove the finest designs from thread which was spun by her. She even planted the seeds, raised the plants and separated the fibers herself. She worked incessantly from the break of day until late at night. Most of the apparel and furnishings of the home were the product of her hands (My Inventions, Electrical experimenter, May, June, July, October 1919

Dr. Nenad V. Mandich, CEO, HBM Chemical Eng. Corp.

Translator's Note: Nenad is the only engineer after Tesla from the Mandich side of the family. He is known as an expert in his field world wide. He has more than 50 papers and a dozen patents.

FORWARD

The Tesla family has its own special background of culture, history and its own place in the hearts and minds of not only the Serbian and Yugoslav people, but also, many people throughout the world.

Even though they come from one contiguous area known as Lika in western Croatia and of Serb ethnicity, they were primarily weaned on their own experiences, the geography of their domicile initially and later in four other disparate cultures in adulthood- Lika, Vojvodina, Fiume (Rijeka) and America. Nikola Tesla was the intellectual giant in this family, but others, fared almost as well in their respective fields of work and endeavor.

There are some of the highest members of the Orthodox Church who made their mark on history from Archbishop to honored clergymen that included businessmen, scholars and political leaders.

The letters tell us that there was an Archbishop of Sarajevo who comes from Tesla's mother's side of the family (Nikolai Mandich). Others from Djuka Mandic Tesla's family were Trivun, a priest who was the Prelate of Lika. He was killed on the third day of Hitler's invasion of Yugoslavia by the Ustashis in a heinous manner. Then, there is Very Rev. Nikoladin Kosanovic who married Tesla's sister Marica. He died at a rather early age, but, had translated the famous poem by the German poet Schiller, "The Bell" into Serbian. He and Marica and their children spent many years in Rijeka which was part of Italy until WW II. It was known as Fiume. The name means river in either language.

Angelina Trbojevich, Tesla's sister married an Orthodox priest and lived in Petrovo Selo, Lika where he was the parish priest for many years..

She is the mother of Nikola Trbojevic and Pavle who became a monk, Petronius. He was the Abbot of Šišatovac Monastery with three doctorate degrees. She is William H. Terbo's grandmother. William H. Terbo was born in 1930 in Grosse Pointe, Michigan where Nikola worked as an inventor and engineer in the auto industry. Nikola Trbojević had more than 150 patents to his credit.

William H. Terbo lives in New Jersey and in California at the present time. He retired after working as an executive for RCA; then Western Union and finally for MCI. He and Jovan Trbojevich, his cousin, are the only living members of the family in the US on the

Tesla side and Dr.Nenad V. Mandich, CEO of HBM Chemical Eng. Corp. and Nebojsa Mandic who are on Tesla's mother's side of the family.

The correspondence is varied due to the commensuratee with the educational level of the correspondents of the letters..

The Serbian language is verbal and highly inflectional with declension and conjugation. There are seven cases of declension and about five conjugational use of verbs.

Unlike English, a sentence can begin with almost any part of speech due to the inflectional nature of the language using paradigms. Therefore, many sentences will begin with verbs and sometimes have what we consider long dangling participles.

Embellishments of ideas, thoughts or activities are usually done with dynamic words such as verbs and not like the English language using mostly static adjectives and their modifiers adverbs, etc..

I tried to keep as close to what they had written including their regional verbiage and sentence structure. Accuracy of ideas was more important than aesthetics in this case.

The Serbian language belongs to the Indo-European language family. It is in the Slavic branch of this family and stems from Old Slavonic that was used about a thousand years ago by all the Slavic speaking peoples..

Nicholas Kosanovich, Executive Sec./ Treasurer, Tesla Memorial Society, Inc.
Translator

Marica Kosanovic to Nikola Tesla
Tesla's Sister

Plaski, Lika
1882 no month

My eyes are filled with tears as I write this letter-and why tearful eyes? This question I know that you will not understand-at least-to think about it I can write tearfully. I have no reason for tears, but, it would be enough and that is after 6 or 7 years a letter to a brother (God knows to whom I write) and will he reply or not. My dear brother , above everything else, if you reply and I honestly don't know how to tell you that hearing from you would make me very happy.

Mother(Djuka) came here for a few days to Plaski by us and she begs that you write to me. She is well. They have a new parish home now (Tesla's father was Rev. Milutin Tesla). It is next to the gimnazium (high school).

I am well. I have two children and lost two children.

Little Danica (older of the two) is 5 years old. Milica who came after Danica passed away.

Dragisa was a still birth. Now I have a son 3 months old. I gave him father's name Milutin.

I am happy and satisfied with my life thanks to God, but, I grieve for my family. I am far away from all of them and never see them. I did not see mother in 2 years until day before yesterday. She arrived here. It is the same for sister Milka and you, whom I love most of all and cannot see you-let alone receive a letter from you from time to time.

I have five male in-laws. One is a Lieutenant who is Jovo. the second Svetozar hopes to join soon. The third Sava received a Tekelija ¹ scholarship to study medicine, but, due to the Hungarian language which he must learn at the University of Budapest, he cannot remain there and he is home now. He is taking a year off and he is physically weak. I hope he studies Theology next year. Djuro, the fourth, is studying religion in Karlovac and is in the 5th grade of high school. The youngest Stevo has a small school stipend and is in the fourth grade of the Realka high school.

When Sava was in Budapest he got your address-thank God he was able to get it. Now, I can write to you.

Angelina and Jovo Trbojevic are well. They have three children-Soka, Perica and Mirko. Two months ago Milka gave birth to a daughter and named her Djuka after mother.

Dear brother: In the name of mother now standing beside me, I beg you to write at least one letter-just like the one sent to Vujo that you long for the family. Please write to me and I will keep you abreast of everything here and about everybody most accurately. How sweet it would be to get a letter from you! What would please me more is a photograph of you.

My dear brother, make us happy and send a photo of yourself to a caring mother. Here she begs me to do this.

1.) Tekelija was a Serbian banker who founded Matica Srpska in 1829 in Novi Sad.

I would have hope dear Nikola that you will do this. How many times a wish from a sister and a mother-you don't know how many times she cries! She has you as an only son-if you write than I will have things to say.

I feel that if I were in your shoes, I would be happy to receive letters, more than God knows what; it would be a cure for longing.

Rev. Nikoladin (Marica's husband) and Sava send you greetings. Niko has written you a letter and could not find your address.

Mother requests a reply and a photo and about your father's tobacco, we can send it. How sweet it would be to receive a letter from you!

All of the aunts and uncles are well. Now, I beg you to reply and accept our warmest greetings and spiritual love.

From Sister, Marica Kosanovic in Plaski, Lika and now tears are flowing from my eyes, because, I am afraid of what is my name and where I am. With God.

Nikola Tesla to Sima Majstorovic
Tesla's Cousin

New York, N.Y.

January 9, 1890

Astoria House
Nikola Tesla, E.E.
New York, USA

Dear Simo:

Here I am today sending another 150 Forints (\$160) and I sent 150 Forints as I arrived here. . I still did not hear a word from the uncles or sisters to whom I had written. I am anxious to know how you are. I am especially concerned about Marica; let me know as soon as you receive a letter. About the wine, no trace or word , maybe the friend Gomijac rethought after he found out the price. My job suits me fine; I will shortly tell you the news. If you have gone to Primorje (Adriatic) or intend to go, tell my mother and uncle about those 100 Forints I had promised; I will send this money as soon as you arrive and need it. Just take care of ourself that you become well. Say hello to my mother and uncles and in-laws and the rest of the family.

Your Nikola

Translator's Note: This is most likely the first letter Tesla received in the U.S. He arrived in 1884. The first two letters were evidently to Budapest or to Paris, France where he worked prior to coming to America

Nikola Trbojevic to Nikola Tesla

My Dear Uncle:

Detroit, Michigan

I am sending a check here for \$250 based on today's conversation. I am sorry that you were ill. Watch your health because the evil influenza can return.

My ulcers are completely cured and now my stomach is in complete order and still have acid (irritation) and some kind of cramp or "spasm" in the duodenum. The doctor says that it will go away when the stomach heals.

As I told you, I am living in a small bachelor's hotel (men). However, I visit my wife and Jackie and I pay all the expenses. You will at your convenience understand that I was absolutely forced to make that desperate step, because, my work and life was in danger due to my nervousness. What is one to do! Now, I only work and sleep and read and gained four pounds already this month.

Back home they write that all are well and think about you. Your,

Niko

My son

al reasons. He
nds me.
you cousin's
and I thank you
that God
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Nikola Tesla to Nikola Trbojevic
Tesla's Nephew

Hotel Pennsylvania, N.Y.

January 28, 1929

My Dear¹ Nephew:

I received your letter of the 25th of this month with a check for \$250. I thank you very much. As soon as I get a check that I am anticipating, I shall return the \loan\.

I am very sorry that your domestic matters are so unsettled. That is a serious and dangerous situation because women have much power in America. Look, if your wife falls in with an unscrupulous lawyer's hands who will fleece you and cheat her. The best would be to that is somehow to solve this problem. I am afraid that with my best intention when I wrote to her under that \pressure²

Discuss your health problems with her when it is restored. You don't write anything about your work. Did you achieve you work goals?

My friends in Philadelphia are progressing very well. According to my thinking, we might need a rear axle drive.

I greet you warmly,

Your Uncle, Nikola

Translator's Note: Nikola Trbojevic is William H. Terbo's father. It looks like there was a clash of cultures and misunderstandings at home.

Nikola Tesla was in the autumnal period of his life when he had grandiose plans to develop and build a helicopter which was a costly undertaking. As always , Tesla never had enough money to pursue his projects

Nikola Trbojevic was under constant pressure trying to satisfy his client customers who were on the ascendancy in a new and large field-the automobile..

Nikola Trbojevic to Nikola Tesla

Tesla's Nephew

My Dear Uncle:

Detroit, Michigan

March 6, 1929

I have been talking a long time about my difficulties as you well know. However things are much better. My wife probably like me because she does not want a divorce. I am still staying at the hotel (because of much work and my health) and Sundays I am home and then I go with her and Jackie to the theater or for an automobile ride.

My work is going well now and only yesterday the first time I produced an accurate gear for the rear axle at Timken. This gear now runs very well on the block and now we shall make in 2 or 3 days, 3 axles and put them on the dynamometer. I believe that it has 97% efficiency, because, I have 400% more oil pumping action than heretofore. If this succeeds, this is an idea for new types of bearings that will compete with ball and roller bearings.

How are you? How is your health? Please write.

Niko

Nikola Tesla to Nikola Trbojevic
Tesla's Nephew
My Dear Nephew:

Hotel Pennsylvania, N.Y.
March 14, 1929

I wasn't able to answer your last letter immediately, because, a lot of work here in Philadelphia.

I was very pleased that your work with Timken which has a good outlook and that your domestic situation is improving.

\I can't\¹ understand why that a greater amount of oil circulation is so important. That can be easily achieved. The main thing is that it is \realized\² precision and that the surface is in contact which increases \whatever it can be\³. There is always some \minority\⁴ oil that gives the best results. In my turbines when the speed is more than 150 RPM\ it cannot be utilized \much\.⁵

At a higher level the bearings fractionate and break down and sometimes burn.

I would like to know how are your attempts with General Motors turn out? It seems to me somehow that you will be more successful with Timken because these are people of a higher caliber\ than the others.

Your wife would love you if she understood you. Stay at the hotel because distance strengthens the desire.

In some way it is well for me and again it couldn't be worse and until I extract from some source a lot of money. I waited for that machinery-then all will be well\.

What it means I had an awful situation. My heart aches that I didn't\ send to our kinfolk some money-they are suffering\ and must have happened \unnecessarily\.¹²

Greetings to you. Wishing you great success.

I remain, Your uncle Nikola.

March 14, 1929
Pennsylvania, N.Y.

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Nikola Tesla to Nikola Trbojevic

Tesla's Nephew

My Dear Nephew:

Hotel Pennsylvania, N.Y.
March 27, 1929

I could not figure out from your yesterday's letter that this surface of $(8 \times 5)/2$ times greater¹ in your unit than it is in a normal worm gear along construction lines or only because of this that it is peripheral velocity so much² greater? In the first case the result will be however better because there is a specific pressure only $2/(8 \times 5)$ from normal under the same weight. In a similar way than what will be achieved in another case if peripheral velocity is not too great.

Your theory is rational but it must be expressed differently. It is direct³ cause of improving the speed but a consequence from the same⁴. You can verify this with simple calculations according to the law: $mv=ft$ (Newton's Law-translator's note).

When the skin is thin⁵ from oil breaks and forces the worm gear in metallic⁶ contact with the wheel with a very high speed according to that which penetrates is unknown and besides this skin becomes so to speak unbelievably thin before it breaks. But your idea is in common with experimental results as speed is increase of⁷ with the moment of necessary pressure under which the skin breaks. Which is $P=C(V)$ pounds ($C=8.25$). Your first pressure will be $(8 \times 5)^{1/2}/2 = (4 \times 25)^{1/2} = 2300/400$ and 2.06 times greater than normal and the skin will hold up longer than in all of these situations.

Oiling is necessary otherwise the components will burn up or wear out little by little. For them to last the longest it must have a large surface i.e. specific pressure; two: high speed; three, precision and four, worm gear of the hardest metal.

The following is in English

To express the heart of your improvement in English: 1) you resort to high relative speed in order that the pressure necessary to break the oil film may be greater and that thereby this better enabled it to penetrate further and get closer to the locus of maximum pressure or dry contact. 2) You employ a constructively larger contact surface to reduce the specific pressure and to do so still further enhances the first effect.

Your theory is correct and entirely dependable. If you do not get better results than with the ordinary forms of worm it must be due to some trivial cause; most likely a lack of precision in cutting and mounting the gear or to the use of a poor metal.

Your Honest Uncle

Nikola

Translator's Note: I used fractional exponents like $1/2$ in place of the square root radical more commonly used in engineering books. It is much simpler to do on a computer. Parentheses were used to integrate the numbers for a particular group within a fraction.

It is surprising that a man who is mostly an electrical engineer to have such detailed knowledge of mechanical engineering. It is believed that he did not take courses in that discipline but is an autodidact in all of human activities.

Nikola Trbojevic to Nikola Tesla

Tesla's Nephew

My Dear Uncle:

Detroit, Michigan

April 23, 1929

Here I am sending specifications of the Timken Cam Gear and the same gear is for General Motors.

Thank you for your interest and now I will tell you the difficulties with this "worm gear"
Remainder, written in English

We have a ratio of 26 to 6; 5 1/4" centers, 33° helix angle. The worm is bronze.; the gear is steel and hardened ground. Length of worm is 4 1/2"; length of helical tooth in the worm is 8/12".

We are getting a "bearing" in the worm through the entire length of its threads, 8 1/2 inches in each of the 6 threads. The gear tooth has a short bearing, about 1". The errors in spacing of gear teeth are maximum .0045" for which reason the drive is noisy at high speeds (2,000RPM) and has not simultaneous contact with 4 teeth at once which would be the case if the gear teeth were evenly spaced. Now, I am trying to reground the gears in another machine and hope to bring the spacing errors down to .0005" which I think would be close enough.

In action, the steel gear tooth enters the hour glass worm at one end, and rides over it as if over a cam through the said distance of 8 1/2 inches. Comparing this with the conventional worm drive (in which the gear is made of bronze), the length of the bronze tooth is only 2" for the same centers and ratio. So you see that I ride over bronze 4 inches faster than formerly, which ought to give me a better efficiency as I uncover 4 times as great an oil film area per second. At the same time we¹ have an overlap of 4 teeth whereas the present gear has only 1.5 overlap. The cost of manufacture is approximately the same as formerly; perhaps even less on account of less bronze being used. At 33° helix angle the drive "coasts" very freely from which I hope that the efficiency is rather high.

Regarding the surfaces that contact, the gear tooth² is convex everywhere, the worm tooth is partly convex (in the mid portion). This may cause some trouble as convex pressing upon convex will smash the bronze. The wear is very favorable as the gears tend

to wear themselves always in a more and more accurate profile; so far as I could see it.
The gear being hard steel does not wear at all, and if I had an accurate gear to start with,
everything would be easy.

Conclusion is in Serbian

Please write about our work. If it is possible either you or I become successful and all
would be fine for both of us. But time, time fearfully passes rapidly.

Please accept greetings,
Your faithful Niko.

Nikola Trbojevic to Nikola Tesla

Tesla's Nephew

Dear Uncle:

Detroit, Michigan

May 6, 1929

Here I am giving you good new that General Motors returned to my "steering gear" and we have renewed the experiments. Now we will completely abandon "bronze" and will build a worm gear of steel. I corrected the design now and hope this path will go further.

The method of cutting spur gears for transmissions by means of "solid worm" types of clearance hobs also is progressing satisfactorily and I have good reason to believe that this job will go over big; as we already \have¹ cut some gears in which the involute was within .0015" and that is just the beginning.

How are you? I am afraid that things are not going well with you since you don't write.
Please call,
Your Niko. 1) inserted

Nikola Tesla to Nikola Trbojevic

Tesla's Nephew

Written in ENGLISH

Hotel Pennsylvania, N.Y.

May 28, 1929

My Dear Nephew,

Under enclosure I am returning you specification description of the [hour glass] work with some suggestions relative to the same.

You are very deep, indeed, in gear science and must have burned a lot of midnight oil /to/¹ evolve such a device. It is evidently a very valuable invention and there is no doubt in my mind that you will secure broad claims.

The greatest advantage of your work is the relatively very small specific pressure {total gear pressure lbs /area of actual contact sq. inches}. It has a beneficial effect on lubrication and efficiency and with greatly reduces wear that administers pressure according to an exponential function. You do not get a greater speed but only uncover a /larger/² oil film surface per second. The speed of the worm is the same as that of the wheel /since/³ /es/⁴ there is no slip. Nevertheless you will improve the lubrication /through the reduction of pressure/⁵. The force of adhesion is /so/⁶ great /enough/⁷ /as/ to carry the oil into the pressure area at the smallest velocities but, at which the pressure p= cuv. As the coefficient c is usually not much greater than 8. It is clear when driving the worm with /a/⁸ low speed in /engine/¹⁰ the lubricant is cut off not far from its entrance into the pressure area so that for a considerable portion of a revolution the gear runs dry. In turbine operated worms the conditions are incomparably better.

Your method of generating the teeth has /much/¹¹ impressed me. /very much/¹². Irrespective of its practical value it is a notable contribution to theoretical science. You have an almost uncanny knowledge in this field. The modification you have indicated with two worms may be useful in driving /the/¹³ twin screws of slips. The spur gears, I understand have to work to perform then keeping the worms in step.

I hope that you will soon attain perfection in the manufacture of this worm drive which is [ideally skilled]. for trucks and automobiles. In my opinion you will reach quicker results by making the work of Nitrogen hardened steel instead of bronze. You must remember that the life of a gear is limited to /that/¹⁴ of its smaller member and bronze is advantageous only /when/¹⁵ in /¹⁶ sliding contacts.

With best wishes
your devoted
Nikola Tesla
Nikola Trbojevic
The Timken
Clark Avenue
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[Post] Pennsylvania, N.Y.
May 28, 1929

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You must remember
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With best wishes for success I remain,

Your devoted uncle,

Nikola Tesla

Nikola Trbojevic

The Timken Detroit Axle Co.

Clark Avenue, Detroit, Michigan

1.) correction greater 2.) cursively written 3.) redrawn 4.)redrawn 5.)inserted 6.)redrawn

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Nikola Tesla to Nikola Trbojevic

Hotel Pennsylvania, N.Y.

Tesla's Nephew

May 16, 1929

My Dear Nephew,

I hope that you received your specifications that I sent with my recommendations. One must complete as much as possible because your patents based on \your¹ important² company where you began this work.

You did not have to be / a genius³ to guess how it is with me. It isn't bad but terrible.

As I told you before I developed a wonderful invention, a /new⁴ by which⁵ [...] in a completely simple way will be able to produce rays so called unlimited power. /You⁶ /can⁷ use and is for distances⁸. I turned to my best friend in Paris to telegraph and send \$5,000 and he hope that he would. I did not know that he was /very¹¹ ill for a year and then word came back that he died from cancer. /I was present¹² at his burial in Washington and still feel an emptiness¹³ in my heart because, we were like brothers for 38 years like one reads in novels. Some of the other people I had business with in 1914, one of my managers messed up my bank account and it is frozen until litigation is complete.

/Again¹⁵ something worse; I loaned last year¹⁶ from the bank in Philadelphia \$15,000 based on my contract with Waltham Watch Co. Not long ago the Federal Reserve announced an edict that crippled the bank and I had to pay my loan /immediately¹⁷ through some friends /who¹⁸ now are in serious monetary difficulties¹⁹. Meanwhile the company Waltham want to buy my patent and I promised to reduce the royalty by 1/3 if they pay me \$75,000²⁰. That seemed a lot to them and the letter predicted that I will be without the money and what is worse, I am afraid that I /still²¹ some few hundred which /cleans up²² and send through until I settle this even with large losses.

Warmest greetings, Your uncle, Nikola

1.)inserted. 2)not made up. 3)incorrect, redrawn. 4)inserted. 5)instead redrawn. 6)redrawn. 7) redrawn. 8)inserted. 9)inserted. 11)instead of.. 12)inserted. 13)redrawn. 14)instead, redrawn. 16)inserted. 17)redrawn. 18)instead redrawn. 19)instead, redrawn. 20)inserted. 21)redrawn. 22)inserted 23)redrawn.

Nikola Trbojevic to Nikola Tesla

Tesla's Nephew

My Dear Uncle:

Detroit, Michigan

May 18, 1929

I received your specifications yesterday with your remarks and today here is your letter. You have spent a lot of time and work and thank you very much.

My work is still going along but I hope better. I am sorry that you have such that you have such unexpected monetary problems. I am also in the same situation; all of my money I loaned to friends. Now I cannot even get the interest and let alone the principle. If I succeed now with anything or a check from General Motors, I shall help you again. Now I am working on three large projects and am completely exhausted and they are: 1) steering gear for GM; 2) clearanceless hob for GM; 3) rear axles, single and double cam gear drive for Timken. I am about to go nuts.

Why don't you try Washington with your new rays? How is your steel, aeroplane Speed indicator?

I read about your notes and remarks. You are truly a master for patents. You would be able to give lectures to those so-called patent attorneys.

I am well and will write as soon as I have time.

Your Niko

Nikola Tesla to Nikola Trbojevic
Tesla's Nephew

Hotel Pennsylvania, N.Y.
May 19, 1929

My Dear¹ Nephew,

Now I received the sad² news that you are also in dire straits. Think about what is /going³ on with Tesla when Trbojevic is in a bad situation.

When you get a reply from the examiner, reprint the specifications with my remarks and it would be fine if I could review the amendment before you send it to Washington. It would be a shame if the patent was issued full of mistakes.

To rely /in short⁴ I did not have enough money to complete the speedometer, because, I had to stop work many times that⁵

With respect to those other [...] metals the engineers want that I put everything in writing to them before there is a contract signed. I did not want to do that, because, I was sure that so many technicians with whom I had cultivated friendly relations break up.

I showed my aeroplane (vertical takeoff) to General Motors and they asked that I send the plans which I have the right to /this⁶. I can refuse. I have e very good patents of the aeroplane, but, I need two more patents⁸ to secure an automobile that will be like a normal car that can fly in the air with /for¹⁰. They don't want to¹¹ accept the aeroplane because,¹² they say it is not their discipline and apparatus for high energy. If I did something like this it would be found out and my goose would be cooked.

I thought much about everything and I saw hat the best solution to my problems is with the Waltham Watch Co. I can get enough money from Waltham Watch to pay off the \$20,000 and could keep as much. My greatest difficulty now is money. I would get out of a hole.

Greetings, Nikola

1.)inserted. 2)instead of redrawn, arrived. 3)inserted. 4.)redrawn 5)redrawn. 6)written over
break 7)inserted 9)redrawn 10) inserted 11)inserted 12)inserted

Nikola Trbojevic to Nikola Tesla

Tesla's Nephew

My Dear Uncle

Detroit, Michigan

May 7, 1929

I received your kind letter of last week and I am sorry that you are in such a bad situation. My work is going much better-steering gears are doing fine and this time I think I will succeed. This time I employed 16 teeth in the gear and 17 teeth (one more) in the cutter to cut the marking worm gear and make suitable corrections in the head of a helixed based diameter, etc. The extra tooth serves to absorb my manufacturing error and it serves fine. Now I can take my gears just as they come from the machine and put them together without any lapping, scraping, etc. and they fit together and run smoothly.

You are surprised that the new Tesla /and/ Trbojevic people are in financial difficulties but the difference is that Tesla is in dire straits because he spent the money but also loaned to friends.

Now I am working on a clearance cutter for steering gears. If this succeeds I will be able to change my contract with General Motors. How things stand today, they have an option for the steering gear for \$100,000 /cash/ non exclusive and \$200,000 exclusive. I would rather change this to straight royalty without options, because, royalties yield \$150,000 yearly. We shall see. My patent applications on the clearance cutter are very strong and indisputable, while, the steering gear is somewhat more vulnerable.

I will write again shortly and tell you how things are going and hope all will be well
As you had written your speedometer, I think about Starret if you completed it. This is a big shame because you had a chance to get something.

Greet you , your nephew, Niko

Nikola Tesla to Nikola Trbojevic

Hotel Pennsylvania, N.Y.

Tesla's Nephew

June 10, 1929

\My¹ Dear Nephew,

I was very pleased to know from your letter of the 7th of this month that you are succeeding in your work. I am sorry that you are like the whole world-angry at me. You are looking for a Diogenes with a lamp in the afternoon that you might find a man who creates imaginary thoughts with less expense than your misunderstood uncle. This was a real mania for me since I began working relentlessly. For the last 40 years I never made any attempt that I had not discovered or completed as is the custom. I always complete everything in my head to the smallest detail and all goes well without changes as planned. Your are correct that I spent the money because you did not see the difference between Tesla and Trvojevic. Tesla loaned all over large sums and did not get the money back at all; while Trbojevic saved like his dad and saved every dollar will come back with interest except those that you loan to the church which is like last year's snow, Die Kirch (church) (guten magen).

You did not understand the situation with General Motors. They don't pay at all² a royalty or buy a nonexclusive license; that is why you saved a least a million dollars in fact without overtures. It is easy to get it if the gear is O.K. But noto bene.-they will not pay you not a cent if your specifications aren't better than those that you sent me a short while ago. I was very busy and did do everything to satisfy myself according to your conditions you will get a patent of great value.

I do not know what is the clearanceless cutter and would like to read³ of this invention.

As I wrote you before I am afraid that you will not succeed with the first of bronze, because, it will wear away fast. It would be best if it was liquid nitrogen hardened. This is a relatively new cold process which does not cause distortion and dispenses without the necessity of stringent finish.

Not long ago I broke a rib \near⁴ the heart and for 10 days I was in dreadful pain.

Luckily the rib did not hit the kidneys. I will be completely cured shortly.

You don't write about matters back home and that is a good omen.

Wish you the best, your uncle, Nikola 1.)inserted. 2) same. 3)same 4)same

Nikola Trbojevic to Nikola Tesla

Tesla's Nephew

letterhead-Timken Axle Detroit Co.

Detroit, Michigan

My Dead Uncle:

July 13, 1929

I haven't written in a long time due to a lot of work. My steering gear for General Motors looks like it has passed the tests, because, they have decided to go into production beginning October 1 of this year. Now we have completed models for Marquette, Oldsmobile, Oakland and Pontiac and now we are working on Cadillac and LaSalle. I have hope that this will succeed and I will make some money.

I completed basic units at Timken a while ago for the Stutz and this week will be a test for a dynamometer. They already tried to break an axle but could not break it. This is a good omen.

How are you? Did the pain in your ribs go away? About the old country, we write regularly and they ask about you always special my mother,

Your Nephew, Niko

POSTAL TELEGRAPH

Nikola Tesla to Nikola Trbojevic

New York, N.Y.

Tesla's Nephew

October 4, 1929

Opponents want to get my stocks. Now I am positive that they cannot succeed. That amount has to be paid, Uncle

Nikola Trbojevic to Nikola Tesla

Detroit, Michigan

Tesla's Nephew

October 4, 1929

Dear Uncle:

I am sorry that they cannot help you for now and I am also in a bad situation. I did not even get any money from General Motors and if these Timken axles do not succeed, I can even lose this job. Besides that my wife is ill and a baby is coming in April. I am myself to blame for all of this, because, I had enough money for myself, but, I loaned out all over the place and cannot get anything back. Here is \$100.

Your Nephew, Niko

Translator's Note: Alice Trbojevic gave birth to a son in April 1930. He is William H. Terbo.

Sofija Alagic to Nikola Tesla

Celje, Slovenia, Yugoslavia

Tesla's Cousin (cousins are considered brothers) November 12, 1929

My Only Brother!

I think and hope that I can truly call my brother. Your dear deceased mother with you and your dear sisters were on her lap and with her motherly kindness raised me from one year of age since I lost my mother.

After we went in different directions throughout the world and the older ones in our family passed away, only you, Angelina, Marica and Milka with uncle Toma are still alive, but, we are so far apart that even in despair or difficulty we cannot help each other.

Dear brother, prior to the war everyone lived for himself and lived pretty well. After the war some died and some were killed and some left home and everything is turned around and life had debilitated all and one cannot live with conditions here.

My youngest daughter was married to an Orthodox priest in Slovenia and three years ago he got tuberculosis and passed away and she, poor lady, was left with 5 small children in a strange land. That is how I come to her possibly to help her with my small dowry. Up to now things were OK, but this year, I became ill in August and was in bed two months and the doctor and medicine are expensive and I ran into debt and was weakened. One does not know where to turn. I would like to return to our country (Lika, Croatia)) but I have no funds. Three children are in high school and two in the elementary school and I took the liberty to ask for help so that I can pay some debts and move to our land where there are school while I am still alive, because, my daughter would not be able to go anywhere and it would be a shame. The children are honor students. I have aged-73 years of age and cannot help much.

Dear Nikola I beg g you not to let me down and give me at least some little support and that we can leave this strange land and have funds to go back home. We are in Celje between Maribor and Ljubljana. Believe me that I agonized a long time before I made this step to write to you. With the Serbian custom of sisterly love,

Your Sister Sofija Alagic.

Accept a kiss from my daughter and her children.

Nikola Tesla to Nikola Trbojevic

Tesla's Nephew

Dear Nephew,

Hotel Pennsylvania, New York, NY
October 4, 1929

I had some trivial matters and so many to take care of that I could not write until today.
I am still struggling with my money problems.

I am sorry to hear that your immediate situation is getting worse. With respect to
General Motors I had predicted to you four months ago. I said that they would not pay
you anything for that patent as it was written. Too bad that you did not inform me sooner
about it. I still have not finished that work on metals so that this time I am not going
into debt for a large sum that is needed for the project to begin.

I hope you he best, Your Uncle, Nikola

Nikola Trbojevic to Nikola Tesla

Tesla's Nephew

Dear Uncle:

Detroit, Michigan

November 18, 1929

I received your letter November 12 with an article by you in "World Magazine". My
God, you [...] Edison . Too bad this will not help you much in your work, because,
Edison became an American Institution or symbol, like the American flag and whoever
criticizes Edison, he runs into a hornets nest of opposition from every American. It is a
thankless job to criticize Edison in America.

I would like to clean up that debt you owe me of \$700 that I gave you as my share
/immediately¹. Send me an IOU note so that I have an acknowledgment from you.

About the \$2,500 that I gave you last year and tell me truthfully and honestly-1) Do you
have a contract with Starret Tool Co.? 2) Do you have a patent? 3) Do you have
production? 4)Do these people know I have a 20% interest?

All my things are going slow and that is the reason I ask if you can put them in order or
not. You can pay me when you are in better straits. If it is in order, send me a copy of the
contract and patent. If you don't have either, then, send a note for \$2,500 plus 6%
interest.

Back home everything is fine. Mother asks about you. Your nephew, Niko

Nikola Tesla to Nikola Trbojevic

Hotel Pennsylvania, New York, NY

Tesla's Nephew

November 20, 1929

Dear Nephew,

I received your letter of the 18th and I gathered that things are bad with you. Do not become pessimistic. Things will surely turn around.

You are wrong about Edison as an American institution. All of the propangda does not worth one iota. My article had a big impression and you are correct it does not help me. /I think/¹ that you are not normal, because, you demand that honestly and openly ask how are things with Starret Tool Co. /0/². I had expressed so much about this that I don't know what else to say [...] preliminary agreement with them and then they were very eager as of now to fabricate my old model and I did not want to agree to this because I found out \later³ some things are better and cheaper and this new model would have been made quite a while ago and would have received the money right away. However the work would have been done⁴ in their factory and I watch that because I have already been burned before \this way⁵ either factory like you with GM Co. About the patents, I did not do anything \neither can I⁷ until I complete all \because⁸ that is my big donkey when they mention anything prior to contract signing. About production one cannot mention

In these circumstance \will be¹² best that I give you an IOU for \$2,500 and the same for that \$700 check that you will find in due time.

As soon as I get the money I will complete what I started. Starret wrote me already twice and I had to promise that¹³I would not promise other factories.

I left for you to write the date how you want it, but, it would be better if you put down July 1, 1930 and that would not delay anything.

In the hope that it gets better for you.

Your Honest Uncle, Nikola

P.S. Behrend is very ill. This is a nice man and a true friend. I am afraid that he will not make it.

1)inserted 2)inserted 3)inserted 4)redrawn 5)redrawn 6)instead redrawn 7)inserted 8)redrawn 9)redrawn 10)inserted 11)redrawn 12)instead redrawn 13)inserted

Western Union Cablegram

Marica Kosanovic to Nikola Tesla

Tesla's Sister

Hotel Pennsylvania

Plaski, Lika, Yugoslavia

December 18, 1929

All of us congratulate you on your Name Day, Marica

Nikola Trbojevic to Nikola Tesla

Detroit, Michigan

Tesla's Nephew

Letterhead Timken Axle Co. February 27, 1930

Dear Uncle:

I have not heard from you in three months and I wonder how are you? My work is very difficult and things are not going well, but with luck I still hold my job at Timken.

My wife is going to have a baby in 2 or 3 weeks.

If it is not difficult for you, can you send some amount of your debt? I am in a difficult position because of these worries, expenses, etc. I ask you to pay whatever you can.

Greetings from, Niko

Nikola Trbojevic to Nikola Tesla

Detroit, Michigan

Tesla's Nephew

April 22, 1930

Dear Uncle:

You did not answer my last letter I am so sorry for you.

My wife gave birth to a son who is healthy and beautiful. 10 lb. 10 oz. His name is Pavle (Paul). She wanted to name him William (after her father) and I did not allow it, because, we did not ever have a William in our family.

My work is so so and I have a problem for money. General Motors is making 1,000 of my steering gears daily (for 3 cars) and I do not get money from this as yet. I now have 5 patent pending for the steering gear. The first two were "allowed. I hope this summer all will be, then, I shall receive some money from GM. I now began 12 experimental pieces for Ford Model A. I will tell you if I succeed. This gear will give a 30% longer swing (55° Vs 41°) and will be 500% stronger than the present steering gear. I am still at Timken and don't know how long.

Many Greetings, Niko.

WESTERN UNION CABLEGRAM

RADIOGRAM

Marica Tesla to Nikola Tesla
Plaski, Lika, Yugoslavia
Tesla's Sister December 18, 1930
We are happy with your progress and greet you on your Name Day, Marica

Fanika Tesla to Nikola Tesla
Tesla's Cousin Ruma, Serbia, Yugoslavia
June 9, 1931

Dear Cousin,
Seeing that you are in good stead and in comfortable circumstances to my relative, a
great man and name sake I greet you.

I am the daughter of your late cousin Milutin Tesla who is the son of Josip Tesla, Captain, your father's brother and Marija Tesla nee Mandic.

My father Milutin was a railroad representative in Ruma and married and died in 1914. He left three daughters, two of which married and I the youngest, remained with mother.

I am a representative at the Royal Circuit Court in Ruma. I try to hold my own with my small salary to support my mother and myself.

I would be very happy if my letter reaches you and understand my plight.

Be true and it comforts me to take this opportunity to congratulate you and honored
with the name of Tesla.

Your Niece, Fanika Tesla

WESTERN UNION TELEGRAM

Nikola Trbojevic to Nikola Tesla

Tesla's Nephew

To Governor Clinton Hotel

Detroit, Michigan

July 17, 1931

Your sister Angelina passed away day before yesterday, Niko

Uros Trbojevic to Nikola Tesla

Tesla's Nephew

Zagreb, Yugoslavia

October 16, 1931

Stamped Dr. Uros Trbojevic, Attorney-at-Law

I am sending you a picture of my dear mother and your sister Angelina. This is her last photograph.

My late mother liked you right up to the end and with unusual sisterly love.

This love for you was handed down to her children. We, dear uncle, love you. Our love, respect and pride is unlimited.

Accept greeting from all of us and mostly from your true nephew.

POSTAL TELEGRAPH

Marica Kosanovic to Nikola Tesla

Plaski, Lika, Yugoslavia

To Governor Clinton Hotel

I think of you continually wishing you health always and a lot of optimism.

Marica hugs you.

Milka Zoric to Nikola Tesla
Tesla's Cousin

Zagreb, Yugoslavia
December 31, 1931

My Dear and Kind Cousin,

On New Year's Eve people are celebrating of your great jubilee and celebrating with the greatest of enjoyment and I your Cousin want to participate in this your jubilee.

I believe , that as your dear Cousin always remembers those very nice days when we were young in Tomingaj, a most comfortable place meeting with all our kinfolk in social harmony.

Therefore, accept dear Cousin Nikola my honest sisterly greetings upon your jubilee that the good God prolong your life to help humankind You are the pride of Lika and her people and a hero like a war veteran.

Zagreb, New Year's Eve 1932

Palmotic Street

Your Cousin Milica Zoric nee Mandic

WESTERN UNION TELEGRAM

Marica Kosanovic to Nikola Tesla

Plaski, Lika, Yugoslavia

To Inventor Nikola Tesla

July 14, 1935

Wish you he best of health, Sister Marica

Nikola Tesla to Dragisa Kosanovic

New York, NY

Tesla's Nephew

October 2, 1935

TELEGRAM

Tesla asks if Marica is still alive and would like a reply.

WESTERN UNION CABLEGRAM

cable: Plaski from Dragisa Kosanovic

October 3, 1935

Mother is fairly healthy and lives in Susak on Istar Street.

Sava Kosanovic to Nikola Tesla

Tesla's Nephew

Dear Uncle,

Susak, Yugoslavia

October 6, 1935

I know how much you worry about mother and now concerned about knowing about her. I now take the liberty to write to you about her.

As you had said once to me about mother and for yourself that large earthquakes have to happen to disturb you. It really is so. The death of our Uncle Sava, whom you liked very much upset mother and she went to Susak in a villa. She is now here two months and it is very beautiful. The home is very comfortable. There is much greenery around it and the room for a park and across the street is the sea with a terrace and from the window a heavenly view of Kvarner Bay, city comfort with all its amenities.. Mother always liked the city and the sea and here she feels in her milieu, especially when she is in her own home. Her first wish was to write to you a detailed letter as soon as she came here. Meanwhile she had an accident. She slipped on a rock and broke the radius of her right hand. Now, after five weeks she healed completely and is now beginning to exercise. Because of this, she is not writing and is hardly waiting to write to you.

Everyone of your dispatches were energized with animated anticipation and worry about you. Otherwise she is well. She is full of spirit. She heroically accepts life's attack and she gives all of us strength in battle; an unusual intelligence and alertness. She likes humor in her own element. She works hard physically always and does not want to do otherwise. A real sister of Tesla's. Every word about you is like an elixir for her and then feels that she is contented. The three of us always gather around her and not one had ignored her. We are proud that she is this kind of mother. The home in Plaski is very well repaired. Mother did all of this and even there behind Kapela mountain it is beautiful.

Mother jokes and uses your [...]non fueri in capite-still they tell me that I am impractical and I have two homes.

Uncle's death had shook us up, but, there was no help. For his physical strength he lived a long life. He died at our home in Plaski where his heart had always pointed and received our deepest love that he deserved who was such a noble character. He was bedridden for a few months and died of diabetes of which there is enough in our family.

He died giving benediction to mother and us who were the closest in his life. Your telegram was received 10 days prior to his death and said that Tesla's dispatches had prolonged my life more than those injections.

The situation here with us is normalizing which means so much to our family and it is about seven years since we touched base and I felt honored to be your nephew.

Your telegram to mother was received and no news. Brother Dragisa received a letter from Tasic! Mother will tell you what he said and she will write as soon as she can. Don't worry about her, she is well and please try to write to her.

Mother sends her warmest greetings and kiss and says that when you see this letter - thank God that this one doesn't reply often.

With Respect and Greetings,

Yours Truly, Nephew, Sava Kosanovic

Translator's Notes:

Susak is a city on the Italian border next to Rijeka (Fiume) in Yugoslavia

Dr. Sava Kosanovic, Marica's son, was the leader of the Serbian Democratic Party in Croatia prior to WW II. He was a member of the Royal government in Exile in London and the first post WW II Yugoslav ambassador to the U.S.

Charlotte Muzar, his secretary in the U.S. is a Board member of the Tesla Memorial Society, Inc. She brought Tesla's ashes to Belgrade where they are in the Tesla Museum today. Charlotte also founded the secretarial school there after the war.

WESTERN UNION CABLEGRAM

Marica Kosanovic to Nikola Tesla
Tesla's Sister
To: Hotel New Yorker, N.Y.
It is excellent her. Hand is healed, Marica

Susak, Yugoslavia
October 23, 1935

WESTERN UNION

Nikola Tesla to Marica Kosanovic
Tesla's Sister
To: Marica Kosanovic , Susak Istar St., Yugoslavia
I send brotherly greetings happily. Nikola Tesla

New York
October 24, 1935

WESTERN UNION CABLEGRAM

Marica Kosanovic to Nikola Tesla
Tesla's Sister
With sisterly love I greet you on the New Year and your Name Day, Sister Marica

Susak, Yugoslavia
January 6, 1936

WESTERN UNION TELEGRAM

Nikola Tesla to Marica Kosanoic
Tesla's Sister
Went to a great dedication in Belgrade and I represented you. Ljubisa greets you, Sister
Marica

New York, NY
May 25, 1936

WESTERN UNION TELEGRAM

Nikla Tesla to Marica Kosanovic
Tesla's Sister
Never a better represeative and you brother thanks you, Nikola

New York, NY
June 1, 1936

COMMERCIAL CABLEGRAM

Marica Kosanovic to Nikola Tesla

Susak, Yugoslavia

Tesla's Sister

September 29, 1936

I am completely cured with my tuberculosis and further my great brother my 50 year battle
and honor to Dr. Boksan. Will write more, Love, Marica

COMMERCIAL CABLEGRAM

Nikola Tesla to Marica Kosanovic

New York, N.Y.

Tesla's Sister

October 29, 1936

Sent to Susak, Yugoslavia

Representing me was too much for you. I am pleased to hear that you are well again.

Take care of yourself. I am very happy of a relative who helped me in a difficult struggle
that the country and the government survive. Love you brother Nikola

Nikola Trbojevic to Nikola Tesla

Detroit, Michigan

Tesla's Nephew

September 10, 1937

Dear Uncle:

I am giving you sad and sorrowful news that our older son Jackie 13 years of age fell last Saturday from a high tree and broke his neck and died on the spot. This crushed Alice and me so much that it is difficult to write about it. We gave him a very beautiful burial last Tuesday [...] He had two requiem services, one in Serbain and one in Episcopalian. The whole procession was full of flowers from strangers whom we did not even know and a Boy Scout troop were the pall bearers. I have now somewhat overcome it, but, my wife is completely shattered and throws up every day ten times.

How are you? Please write at least a few words. They write from home that in Yugoslavia people are saying that you may receive the Nobel Award this year. May God help you.

I was working recently on a new type of tooth wheel, i.e. a combination of spiral level gear and globoid worm gear and made a few. It looks very good and can back lash successfully.

At home all are well and they are in great fear of a war. Nephew, Niko

Nikola Trbojevic to Nikola Tesla

Tesla's Nephew

Dear Uncle¹

Detroit, Michigan

October 4, 1937

I wrote you two weeks ago about the catastrophe that had happened to us about our Jackie falling from a tree and he died. I don't know if you received that letter. We moved to a new address: 1530 Edison Ave. This home is in a very beautiful neighborhood. It has 10 rooms; 5 bedrooms, air conditioning and has enough space. There are two radios, a good car, etc.

When do you intend to move with us and live in peace and satisfaction in your older days, Alice and I hold you in deep respect and would like to comfort you. Think about it and let us know.

My things are not going so well, but however, I think that shortly I will break out of this lethargy and work again.

Hug you, Your Nephew, Niko

Nikola Trbojevic to Nikola Tesla

Tesla's Nephew

Dear Uncle:

Detroit, Michigan

1936

Please accept the sad news that my aunt and your sister Marica passed away. Please accept my honest condolences. We see now that one by one we are gone; her three sons and one not married. This is how a great family tree will pass away.

Why don't you reply ever with a word or two? How are you? They write from home and ask about you and I cannot say anything. It is difficult enough for me here, but, I hope to swim out of it. My stomach always bothers me. Please answer with a few words.

Your Nephew, Niko

WESTERN UNION MESSAGE

Nikola Tesla to Nikola Trbojevic

New York, N.Y.

Tesla's Nephew

no date

I do not need your help. When I was in most dire straits you did not help. I cannot forget that you denigrated my integrity. I had two wishes; one, after my death that you get my bust by Ivan Mestorovic and that you write a book about wheels. Mestorovic gladly agreed, but, Detroit would die before you write a book. You have crazy luck of that your uncle. I know that outstanding scientists who speak all of the major languages and competent technicians, a doctor of literature can be your secretary and co-worker. One must gather all the sources that you would do at this book stores interpret it technically and that the first book be in English and the Tesla institute could complete your recommendations and we anticipate that you become a useful Serb and write to me soon. Don't worry about my illness; I still am working. Uncle Nikola.

Nikola Trbojevic to Nikola Tesla

Detroit, Michigan

Tesla's Nephew

November 16, 1936

Dear Uncle:

Your telegram was received and thank you. Concerning the book and wheels, I would for now put off and am now completing and completed three new things that will help me financially; they are, 1. Front Wheel Drive (also Rear Wheel if the engine is in the rear), I do not use the conventional constant velocity universal joint which is expensive, but a special constructed oscillating bearing pivoted right in the axle. I will send you blue prints as soon as I have some good one., A basic patent of this idea was allowed.

2.) Steering gear/ 3) Hour glass worm for rear axles.

If this succeeds then I will be able to help you. Uncle Petar the judge is gravely ill. All at home are well but in great fear of a war.

Many greetings, Nephew Niko.

P.S. What kind of characteristic you mention? All of mine are from "hand to head".

Nikola Trbojevic to Nikola Tesla

Tesla's Nephew

Dear Uncle:

Detroit, Michigan

July 14, 1939

I heard that you are ill. How are you? Would you like to move to Detroit? Let me know how you are.

My work was slow up to now, but, I just completed a good "universal joint" and "front wheel drive". I think that I will sell this patent by this summer.
Your nephew, Niko.

Nikola Trbojevic to Mgr. Hotel New Yorker

Tesla's Nephew

Hotel New Yorker

written in English

Attention the Manager, NY

Detroit, Michigan

August 25, 1939

Regarding Mr. Nikola Tesla who resides in your hotel, please notify me in case it would be necessary for me to go there to see him.

I am Mr. Tesla's nearest relative in this country, his nephew, and I am receiving letters daily from my sisters in Yugoslavia telling me that Mr. Tesla is seriously ill according to the rumors and notices which appeared in Yugoslav news print.

I wrote to Mr. Tesla some time ago, but, he did not answer. Please find out from him if I could be of any help.

Yours Very Truly,

Nikola Trbojevic.

Hotel New Yorker, Mgr. to Nikola Trbojevic

New York, NY

Dear Mr. Tesla:

We received the enclosed letter from Mr. Nikola Trbojevic, who states he is your nephew.

We are sending this letter to you so you may take whatever action you deem necessary desirable.

With Respect, we remain, Cordially Yours, Leo A. Molony

Nikola Trbojevic to Nikola Tesla
Tesla's Nephew

Detroit, Michigan
July 14, 1939

Dear Uncle:

I heard that you are ill. How are you? Would you like to move to Detroit? Let me know how you are.

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Tesla's Nephew
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Attention the Manager, NY

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Yours Very Truly,
Nikola Trbojevich.

Mara Mucovic to Nikola Tesla
Tesla's Great Niece
My Dear Grandfather,

Sarajevo, Yugoslavia
July 29, 1939

Think about why I am writing and I would have written if it was up to me a long time ago. I felt that I would be an intruder if I wrote to you as an orphan of a priest.

Today, since I have married with a husband in good standing, I can write to you. I am the daughter of the late Gina and the late Very Rev Petar Lalic. You recognize her as an only child of your late sister and my grandmother Milka. The late grandmother Milka lived with my mother and father where my father was a parish priest in Pazanica and now all of the three may God say their souls are deceased.

I have one brother Nikola and he received his name from my grandmother, your sister the late Milka as a reminder of you the only brother! My brother received a Ph.D. Philosophy and suffered without parents and finally became employed as a journalist in the Zagreb Press Bureau. This is not the best of jobs for his intelligence.

I married an appellate Judge Simo Mucovic who was born in Trebinje, Hercegovina and am happily married, because , my husband is good and is gifted as is my brother. He should be President of the Judicial Court for his ability and years of service and not what he is today.

You know what people say, "Give birth to me mother and throw me in the water so that I can swim out of it.

As I look behind me, I say, Your Dear God gave us what we already have.
I think of you and kiss your hand, Mara.

my address is: Mara Mucovic,

Sarajevo
Zrinskog-Cikma 4/21
Yugoslavia, Europe

Nikola Trbojevic to Nikola Tesla
Tesla's Nephew

Detroit, Michigan
August 20, 1940

Dear Uncle:

Here, now my luck is turned for the better since I received a good contract from Spicer Mfg. Co. in Toledo, Ohio. I shall work (and an agreement) on two of my inventions which I think are good and will have a significant input in the construction of automobile trucks, gyroscopes, etc. The first is the constant velocity universal joint which contains 4 pieces, two are screws. The other is a new type of hypoid gear that will be cut at Fellows Gear Shaper. When there is progress my stomach reacts favorably or some other catastrophic hits. I will tell you about it.

I had a lot of suffering until I had these two problems solved. About the universal joint, I worked six years and tried all possible (like Edison) things until I saw clearly the truth.

How are you? How is your health? I am very concerned about the war and our kinfolk at home who are in serious danger.

Please write from time to time. I will have this office for a time until I see how things go. The (Spicer) pay me very well and have a possibility of good royalties.

Your nephew hugs you, Niko

MACKAY RADIO

Sava Kosanovic to Nikola Tesla
Tesla's Nephew

Zagreb, Yugoslavia
December 18, 1940

I congratulate you on your Name Day dear uncle. Look--our country is threatened on all sides and stops development and progress. Sava Kosanovic

WESTERN UNION TELEGRAM

Nikola Tesla to Sava Kosanovic

Tesla's Nephew

New York, NY

March 1, 1941

I thank Dr. Macek and you for happy news. It is important that you know the following: I developed a new title of eight years using applications from 50 of my patents of which one third are not applied. In the system there are no electrons. Energy goes into the same direction without any distribution and the same on all sides of distance. It contains neutrons. The air is equal to a diameter of hydrogen. It can destroy the largest ships afloat. There is unlimited distance of travel. The same is for airplanes.

One will need nine stations ; for Serbia; three for Croatia and two for Slovenia and everyone needs 200 KW which can defend our dear homeland against any type of attack.

The contents of one bomb can be exploded in the air. I add that in the station one must have a small generator or battery of 30 volts for activation.

Express my deepest respect to Dr. Macek and accept the warmest greetings and thanks.
Your uncle, Nikola Tesla

RADIOGRAM RCA COMMUNICATIONS

Sava Kosanovic to Nikola Tesla

Belgrade, Yugoslavia

Tesla's Nephew

March 1, 1941

I thank you very much for your telegram stop As soon as I do the formalities I warmly greet you. Nephew, Sava Kosanovic

Translator's Note: Tesla was so serious about defending democracy that he tried to utilize his mind to find weapons that could defend Yugoslavia. This is two years prior to his death.

Dr. Macek was President of the Croatian Peasant Party at the time and a member of the Government.

WESTERN UNION TELEGRAM

Nikola Tesla to Sava Kosanovic

New York, NY

Tesla's Nephew

March 4, 1941

As though I am poor with words. I still didn't explain it enough what would be necessary to increase up to twelve stations: eight in Croatia, each of the same construction like at Wardenclyffe and only 20 meters high-a ball five meters in diameter-the station would be using diesel oil for energy with mechanical action-my air turbines, steam powered, electrically or other manners of transforming into electrical alternating current with sixty billion volts pressure without danger. I am waiting for Governor Subasic to select one station on top of Mt. Lovcen¹. There will not be any light, electrical energy will deliver particles through space with the speed of 118,837,370,000 centimeters per second. This is 394,579 the speed of light. As I said about airplanes it can be used for tanks, trucks, automobiles and various machines in factories, wheels with hydroelectrical and unlimited other machines. The particles can be larger than that of the diameter of an Hydrogen atom with metals of all kinds of materials and sent to all distances and good results in war and bring about peace. Particles are practical with neutrons, because, they are 3,723 times lighter than electricity or electrons that cannot penetrate space for great distances. In my attempts with 20 effective million volts, electrons carried 40 times more electricity than normally and penetrated two meters in depth and terrible damage in a moment each I have to finish because that I give you a fresh view.

Warm Greetings, I remain your uncle,

Nikola

1.) Mt. Lovcen is the highest mountain in Montenegro. One can see all of Montenegro from here. Bishop Njegos, poet, prince, bishop is buried on this mountain top. He wrote the greatest epic poem in iambic decameter in the Serbian language, Mountain Wreath- an ode to liberty.

New York, NY
14, 1941

ough what would become
the same construction has
diameter-the rotors with
turbines, steam power,
alternating current will be
generator Subasic to place re
electrical energy will be
centimeters per second. It
can be used for turbines
hydroelectrical and other
diameter of 100 m
and good results will
cause, they are 100 m
ce for great damage but
times more electrical
usage in a number of 100

Nikola Trbojevic to Nikola Tesla
Tesla's Nephew

Toledo, Ohio
June 16, 1941

Letterhead: Nikola Trbojevic
Mechanical Engineer
4100 Bennett Road
Toledo, Ohio, Spicer Eng. Co.

Dear Uncle:

Your telegram of last Saturday was received this morning (Monday). We do not work Sunday's. I go here with my real name and not Terbo. I am surprised about your article that you are planning for Srbobran. You are too late for this, because, our poor Yugoslavia is no more. Our Lika and Dalmatia are now under Italy. It is now the best to keep quiet and bear it.

I have been very fortunate with my invention, because, I received "interference" at the Patent Office and don't know that it is and will not know for months. The wife's operation was not too successful and now she has complications.

I am sending you a check for \$50,000 that is all I can put together. What are your difficulties? Did you lose your income?

I still have two more inventions besides this universal joint. Will see you.

Your Niko

WESTERN UNION TELEGRAM

Nikola Tesla to Sava Kosanovic

New York, NY

Tesla's Nephew

July 15, 1941

To Capetown, South Africa, Yugoslav Minister

My health cannot be better. I eat like a horse rider. I worked on some new inventions for our country that can achieve results. Accept my warm greetings, Nikola

WESTERN UNION TELEGRAM

Nikola Tesla to Sava Kosanovic

New York, NY

Tesla's Nephew

no date

I owe some engineers \$800. Can you send this amount to pay them? I am working successfully but natural laws one cannot avoid. Long live his highness Peer II and his highness Prince Paul and our Yugoslavia. Warm greetings, Uncle Nikola Tesla.

Save Kosanovic to Nikola Tesla
Tesla's Nephew

New York, NY
November 20, 1941

Letterhead, Hotel New Yorker

Dear Respectful Uncle:

I am writing with much trepidation. You said on the telephone that you read what I had said. If it is that which "Srbobran prints-then naturally a wrong picture was given.

That which "Srbobran" printed was the most elemental non intelligent and uninformed paper. You had in life experienced that more than once you were hurt and maligned. I beg of you that you read my interview that I had given in Pittsburgh.

This is how 'Srbobran' writes now not only King Peter and Simovic Government of which I am a member, but also, absolute interest of Yugoslavia, Roosevelt's politics in Russia. The so-called document which was announced has catastrophic tendencies and intentions to justify Nedic in Belgrade who is supposed to defend the Serbs from Croatia-while at the same time at Hitler's command, murdering Serbs from Serbia proper. In today's "Time" magazine there are horrific numbers that they do not even care for those who suffer.

There is no truth and cannot be the truth that Pavelic and the Croatians are the same, if it was so, there would not be a Yugoslavia. Traitors are everywhere, there are some among the Serbs, one should not generalize. That is why Pavelic murdered the best among the Croats! Macek's life is in constant danger; they don't kill him only because they are afraid of a great reaction. Besides this, the Serbs must be the bearers of unity for the Balkan Peninsula.

That group around :"Srbobran" of quasi-intelligent people take a single position from their side. It is a sin that they unconsciously help Hitler and Mussolini. They should help the government . Your name is most respected by all and in the US. It should not be used for evil. Your Nephew Sava Kosanovic

Nikola Tesla to Sava Kosanovic

New York, NY

Tesla's Nephew

December 28, 1941

I have discovered not long ago a new main transmission of unlimited power for the complete defense of our dear homeland. This force that I practically showed will give Yugoslavia unusual power, because, she will be able to destroy all gun power, etc. I will explain everything through my representative. I have worked out a means for this difficult job and please send me by telegraph \$500 at least to Hotel New Yorker. I am very happy that I can help our homeland.

Greetings from you uncle, Nikola Tesla

Sava Kosanovic to Nikola Tesla

New York, NY

Tesla's Nephew

April 2, 1942

Dear Uncle,

I beg of you kindly to send this telegram.

Bad people in Pittsburgh are using your name evily and together with the Bishop and Simo Vrlinich announced you as an honorable president of Serbian National Defense, who proposed as an objective; war against; Yugoslavia, against the Croatians, against the Government in London, and I cannot tell you what they say about me.

The Bishop and Vrlinic alone have refused to accept him. With this it would be more uncomfortable if you also don't do that.

I respect you and greet you, your nephew, Sava Kosanovic

Sava Kosanovic to Nikola Tesla

New York, NY

Tesla's Nephew Minister of State

April 26, 1942

Most Respectful Uncle:

I was in Washington, DC yesterday and could not answer immediately!

I ask you please to sign your fine name so that we can publish it with your signature.

I ask you to send it down to the information desk of your hotel addressed to my name. I shall come myself to pick it up.

Your Nephew, Sava N. Kosanovic

POSTAL TELEGRAPH

WESTERN UNION TELEGRAM

Sava Kosanovic to Nikola Tesla Zagreb, Yugoslavia
Tesla's Nephew no date
Sent to Hotel New Yorker to Nikola Tesla
To my dear uncle greetings on your birthday
I hope you realize some of your great ideas that can help mankind

WESTERN UNION TELEGRAM

I arrived here last week in good order and found Alice and little Jackie also well. My job here at Timken's is not so good as they did not do a thing on my work while I was away, so , I lost two months completely. You know yourself how it is, as soon as you step outside of the plant they stop working on your proposition at the slightest excuse

I shall send you those patent papers etc. as soon as I have a little more time as soon as I get them. Now I am mailing you two photos of Jackie. The photographer took some 19 pictures of him and asked permission to use the pictures for advertising. The photographer said Jackie was the best looking baby of 700 that participated in some sort of contest. It is possible that you will be able to see his picture soon in Saturday Evening Post, etc.

I was looking over the tap situation and it seems it will be difficult to do anything in that line as the present taps are the marvels of perfection and are several hundred percent

better then they used to be only five years ago. On the other hand, I have a fair chance with my new gear hob that is going to cut down the tool cost quite considerably.

So, you will hear from me again How are you and how are your projects moving?
With Kindest Regards,

Sincerely,

Nikola.

Nikola Trbojevic to Nikola Tesla
Tesla's Nephew

Detroit, Michigan
April 29 no year

Dear Uncle:

I cannot understand why all of my letters at least even one was not answered!

My job is going badly. I have so many patents, but , all are very thin.

I met with A.H. Starret from Athol, Massachussetts. They ask about you and wonder if you completed that tachometer or abandoned it. They say if you have any data that they would accept it.

I don't hear much from the old country. There must be a severe depression there.

Write at least a few words. I am so afraid why you are so quiet.
Greetings, Niko

Nikola Trbojevic to Nikola Tesla
Tesla's Nephew

Hyde Park, Michigan
no date

My Dear Uncle:

I just now received your dear letter which I am replying immediately. I am sorry that you are in such dire straits. I understand fully what that is from my own experiences.

My wife and child are well and things are about the same for now. At GM I failed with my steering gear, because, it fell apart after 8,000 miles and while I expected 100,00 miles. We shall try again with harder steel and more exact measurements. I am afraid , will let you know how it comes out.

As to oil pumping action, this is the situation-¹ in worm of actual contact gear the surface stress is up to 50,000 lbs per square inch; no amount of artificial oil in position under such high pressure area. However, the adhesion of the oil film to the bronze will stand up-for a short while, i.e. for an instant. Thus, it is desirable (this is my own theory) to move the

bronze rapidly relative to the loaded area. This explains why the worm gear has a higher efficiency at high speeds than at low speeds. Now, to my new worm gear I have a bronze surface 8 1/2 inches long sliding through the loaded area per tooth, whereas a similar wire present worm has only 2 inches of bronze. Thus, the actual bronze velocity relative to the load is 400% higher for the same R.P.M which ought to give me a higher efficiency unless I am badly mistaken. If this works out I have an idea for a new kind of bronze [...] bearing which ought to be able to compete favorably with the present ball and rather (antifriction) bearings.

Dr. Radosavljevich wrote to me and proposed a Serb , Dr. Vuckovich, but, I don't have time even for myself and less for others.

I hug and kiss you. Wish you luck, Your Niko

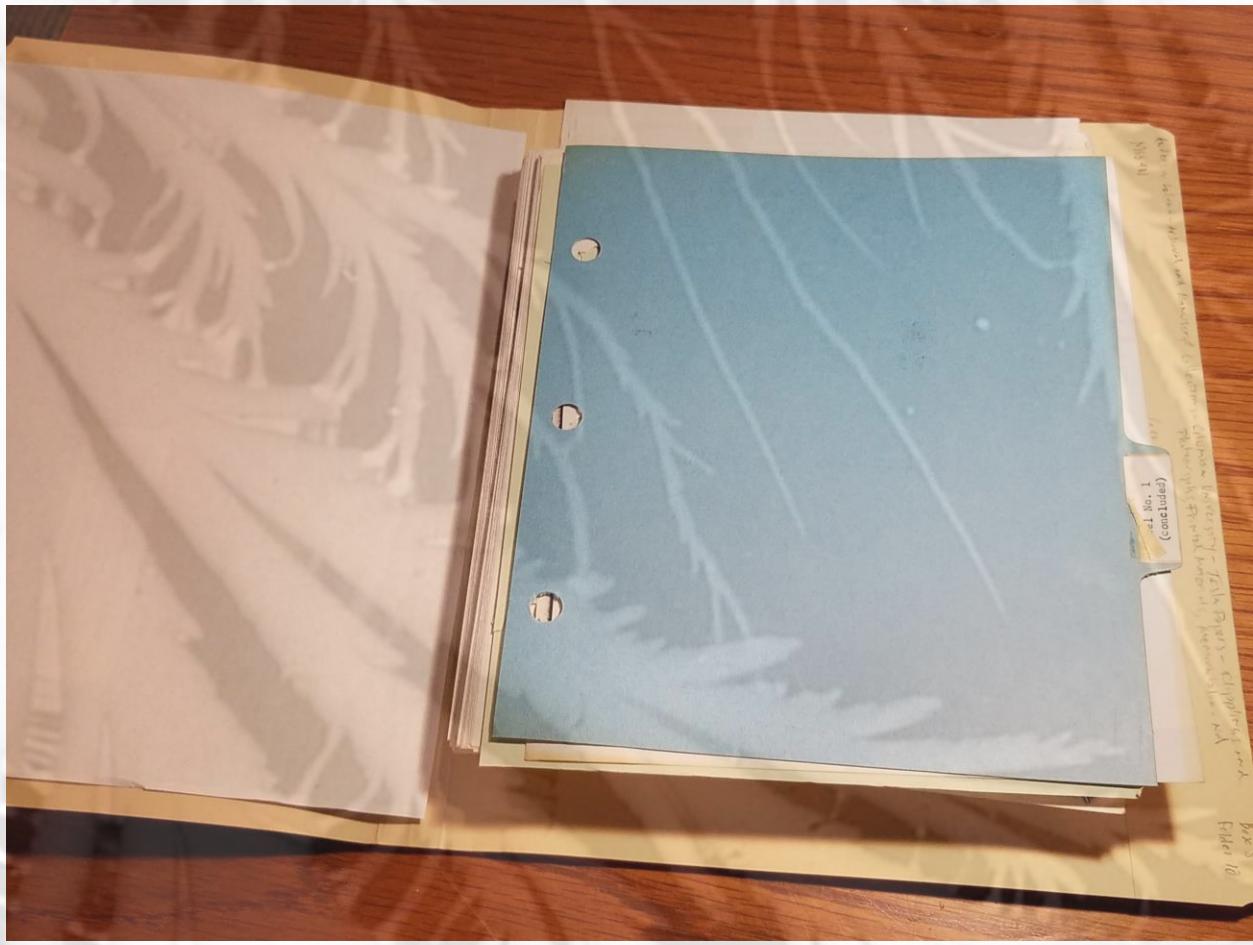
END OF CORRESPONDENCE

- 1) After this the letter was written originally in English.

Translator's Note: Dr. Paul Radosavljevich was older than Nikola Tesla. He was his friend along with Dr. Michael I. Pupin of Columbia University. Dr. Radosavljevich was an ordained priest in the Orthodox church who was expelled from his native Vojvodina which was under Austrian control. It was for political activities fighting for Vojvodina to be part of Serbia.

He was the first of Serbian intellectuals in the US who taught at an American university. He taught at New York University..

NIKOLA TESLA CORRESPONDENCE **BINDER 3**
Xerographic prints from microfilm.
Columbia University Microfilm Reel #1
(concluded) and Reel # 2.
Mss. Box # III (beginning & middle)



Columbia University Library Special Collections
Microfilm Reels of Nikola Tesla Collection (as of 1988)

<u>Reel #</u>	<u>Master Neg. #</u>	<u>Box #</u>
1	3840	I II III (beginning)
2	3841	III (middle)
3	3841/3842	III (end) IV V VI

Mss. Box III (beginning)

PS# 83-0517

BIBLIOGRAPHIC MICROFILM TARGET

MASTER NEGATIVE #

3840

ORIGINAL MATERIAL AS FILMED - Copy of existing catalog record.

TESLA, Nikola, 1856-1943
 Correspondence, manuscripts, documents, photographs and printed material,
 1894 - 1936.

3840 BOX I Cataloged correspondence: Nikola Tesla to Robert U. Johnson and family, 1894-1900 and n.d.

3840 BOX II

3840 beginning Box III Nikola Tesla to Robert U. Johnson and family, 1901-1936; miscellaneous correspondence

3841 end of Box III BOX III Uncataloged materials: photographs, clippings, memorabilia, printed

BOX IV Cataloged correspondence: Letters to Nikola Tesla and George Scherff; Nikola Tesla to George Scherff, 1900- 8 July 1905.

BOX V

Nikola Tesla to George Scherff, 10 July 1905-1930.

BOX VI Cataloged manuscripts and documents; uncataloged printed material and photographs.

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Film size:

35mm

16mm

Reduction ratio: 14X 20X Other: 13X

Image placement: IA IIA (IB) IIB

Date filming began: 3/8/83

<input type="checkbox"/> Withdraw original. Catalog service copy for _____.
<input type="checkbox"/> Original to be retained. Add MN note to cards.
<input type="checkbox"/> Other: _____

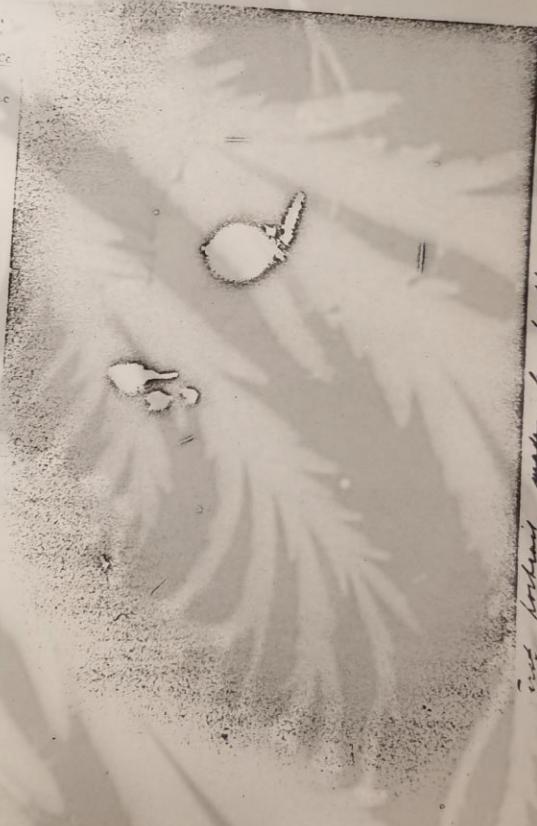
Date to Cataloging: _____

Mss. Box III (beginning)

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12 Photographs

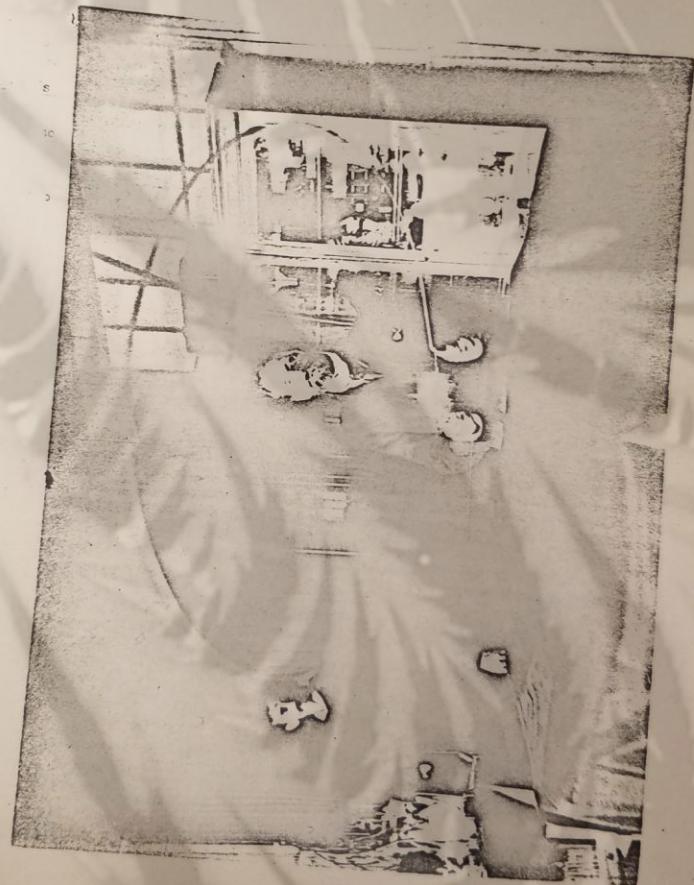
Gift of Mrs. Anne Holden Arbuckle, 1969

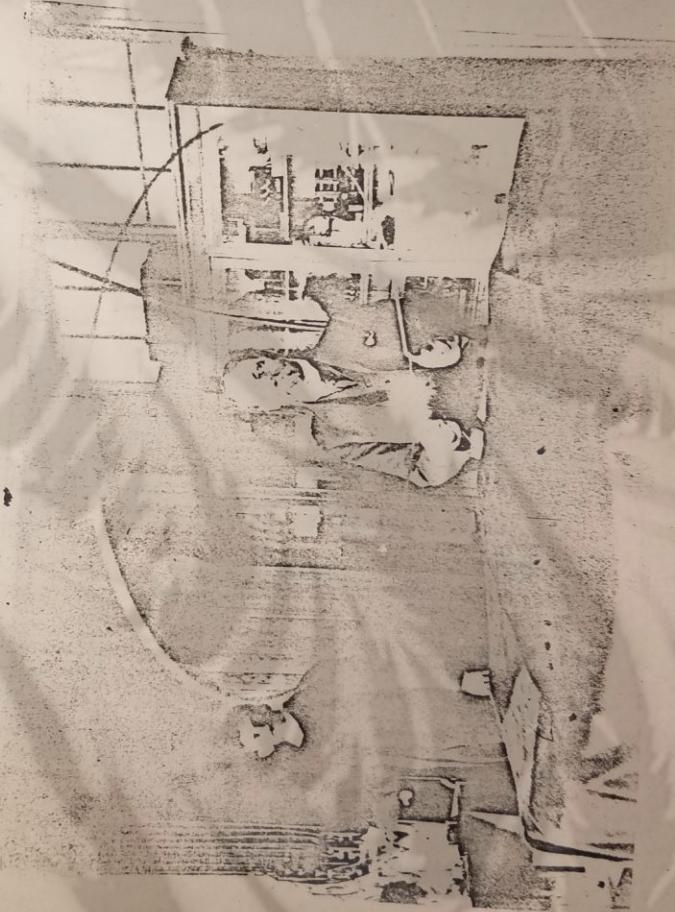


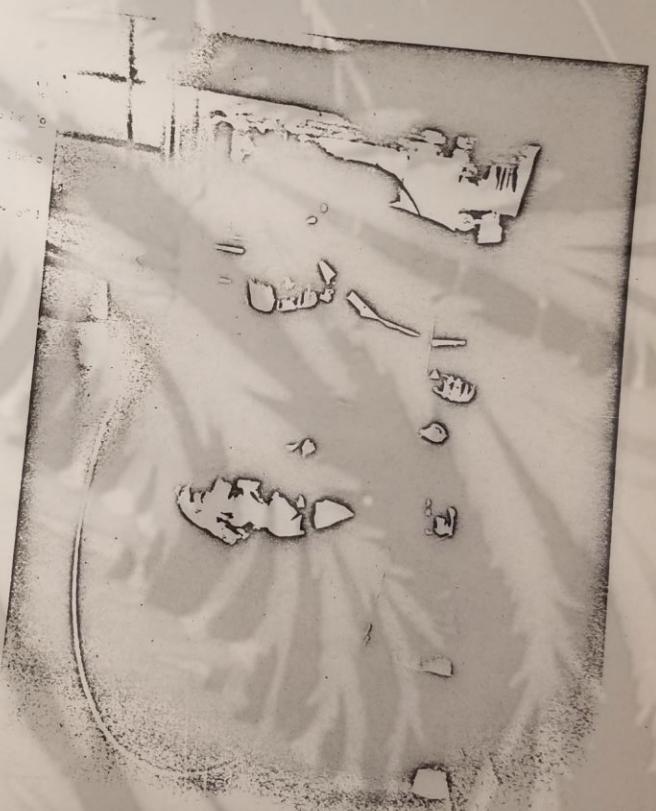
red hooded male to photo screen right.
in his front first; take to Tom's &
leaving in front like the open face
chicks. Train



First sketch made by pencil
in light gray ink. Taken by camera &
camera lens with right eye open
at first time.







12. *Primates*









EQUIPMENTS FOR

NIKOLA TESLA.

Born at Smiljan, Servia, 1856.
Nikola Tesla is a remarkable inventor and electrician who came into the employ of Mr. Edison in 1882. He was the son of a Greek Church priest. Completing a public school course, he attended Karlstadt Real Schule, graduating in 1873. His liking for mechanics and science caused him, in spite of parental objections, to devote himself to experiments in physics and electricity. Allowed to continue his studies at the polytechnic school at Gratz, he completed them, studying languages later at Prague and Budapest. After being an assistant in the government telegraphic engineering department, he was employed by a Parisian lighting company, and the next year (1882) came to the employ of Mr. Edison in the United States.

Severing a pleasant connection with Mr. Edison, he developed the rotating magnetic field motor, and systems of polyphase current distribution, improved the efficiency of the induction coil, and experimented the new field opened up by himself of high frequency phenomena, also wireless distribution of lighting and power, and economical vacuum tube lighting.

His late work has been on syntonic wireless telegraphy.

Mr. Tesla has been astonishingly productive of new lines of scientific investigation, and for this reason has few competent critics.

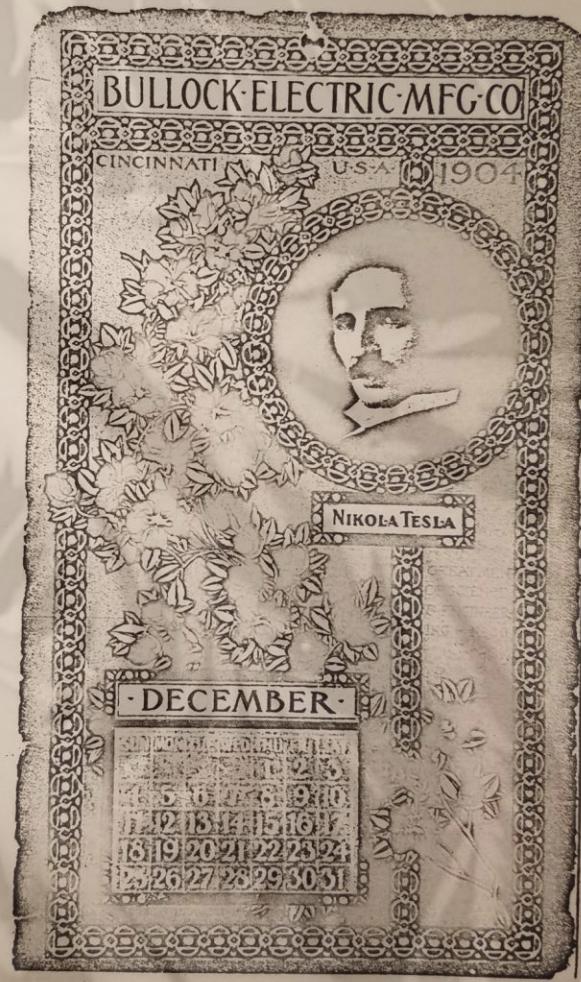
In stature he is a tall, sparely built man, having the modest bearing of a student. A slight German accent clings to his excellent English. He is unmarried and has lived a quiet life in New York City, though of late an extensive laboratory and wireless telegraph station has been built by him on the Jersey Coast. It is interesting to know that his only authorized statements since 1893 have appeared in the technical press and the Century Magazine.

In 1903 there is probably more than \$40,000,000.00 invested in Tesla machines and apparatus.

— and N.Y. Sun.

BULLOCK ELECTRIC MFG.

TELEGRAPHIC AND RAILWAY PLATE





first photograph made by
for photo screen
on the first floor bright; taken by
Brooks & Taylor.
in color, and in white light
and open glass
chiaroscuro.



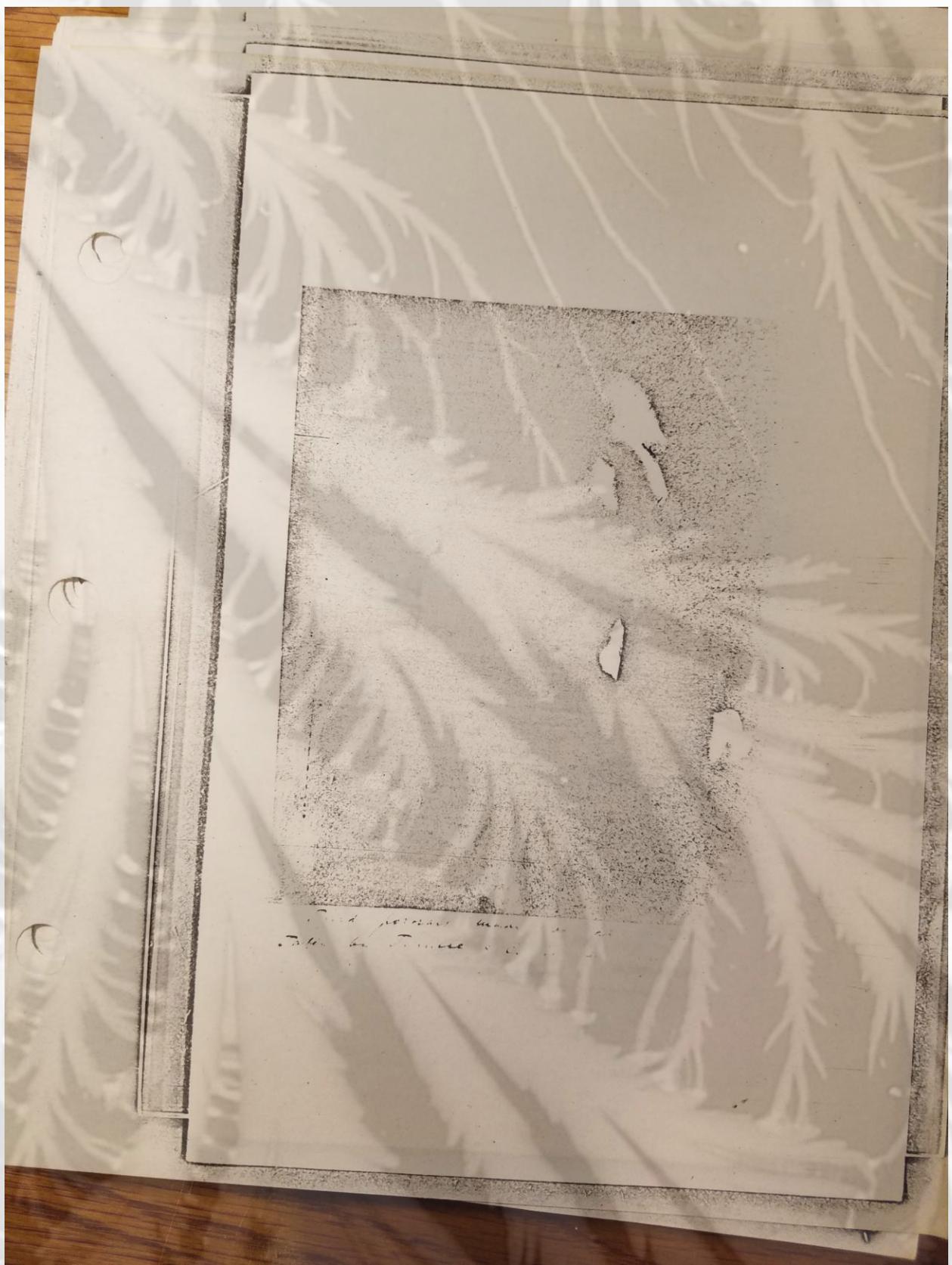
one Northern male of *Proctocephalus*
in the bird house, taken by minnow trap
at Cedarville, Ohio about right
size after being
up river.





First portrait made in Florida
taken by Pendleton & Co. in my room.





12 Photographs
Gift of Mrs. Anne Holden Arbuckle, 1968

12 Photographs



12 Photographs
Gift of Mrs. Anne Holden Arbuckle
Anne Holden Arbuckle
12 photographs - sketch
Portrait sketch
May 1968

Arbuckle

37 UNION SQ. N.Y.

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12 Photographs

Gift of Mrs. Anne Holden Arbuckle, 1969

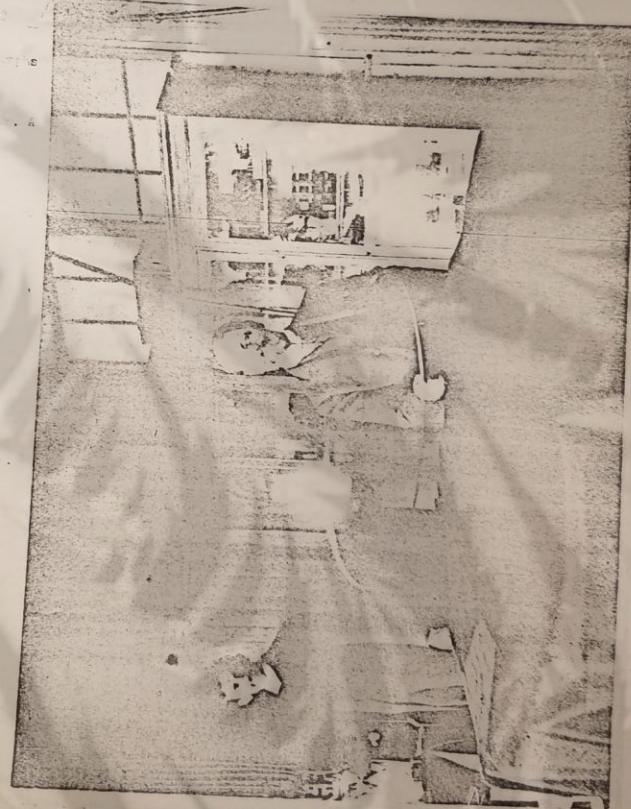


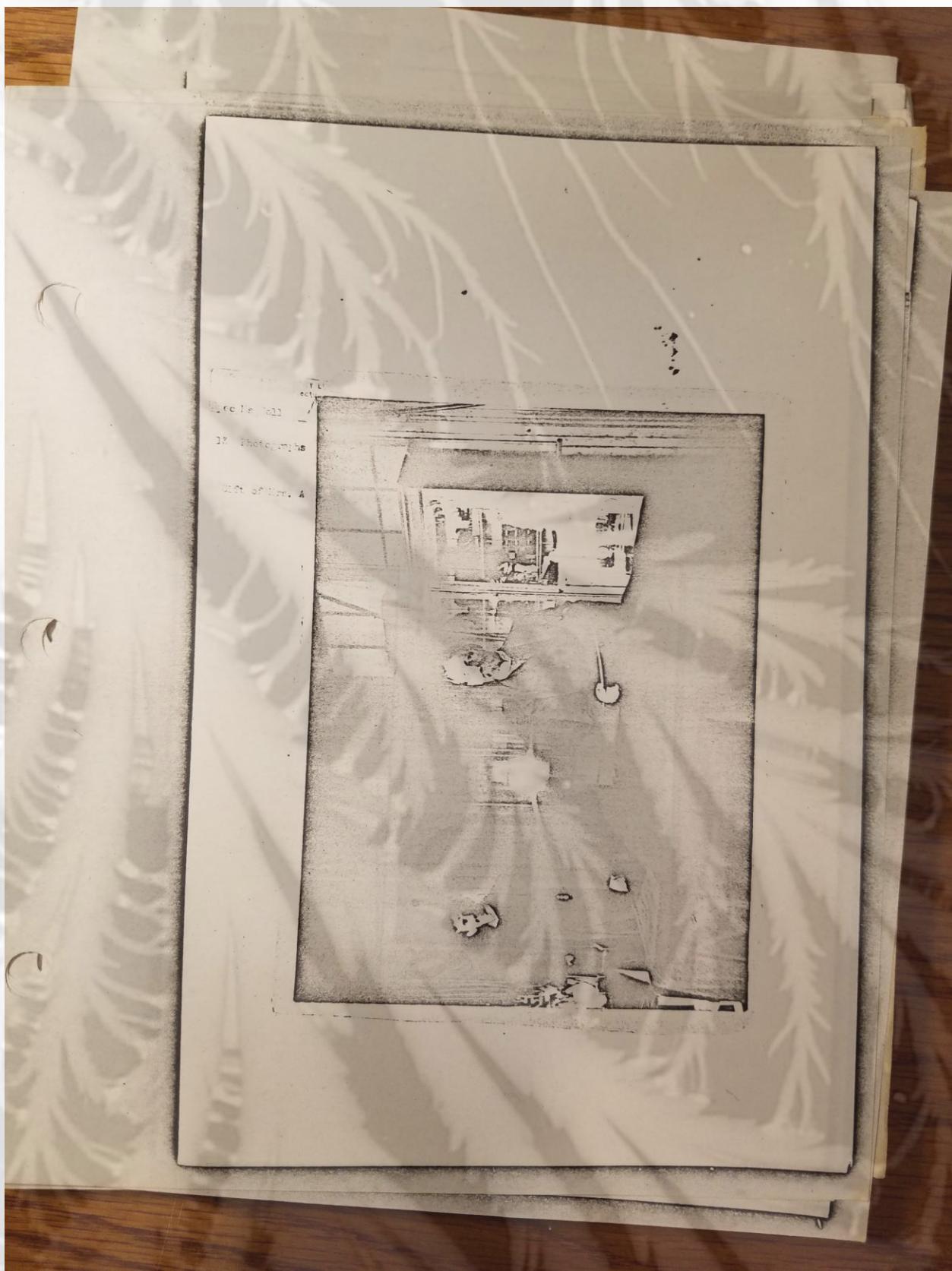
Dec. 18 1895

12. Photographs

List of Negs.

Report of Mr. Frank M. Bailey
Fiji Islands
For Pitt Rivers Museum, Oxford
University, Oxfordshire, England
December 1895





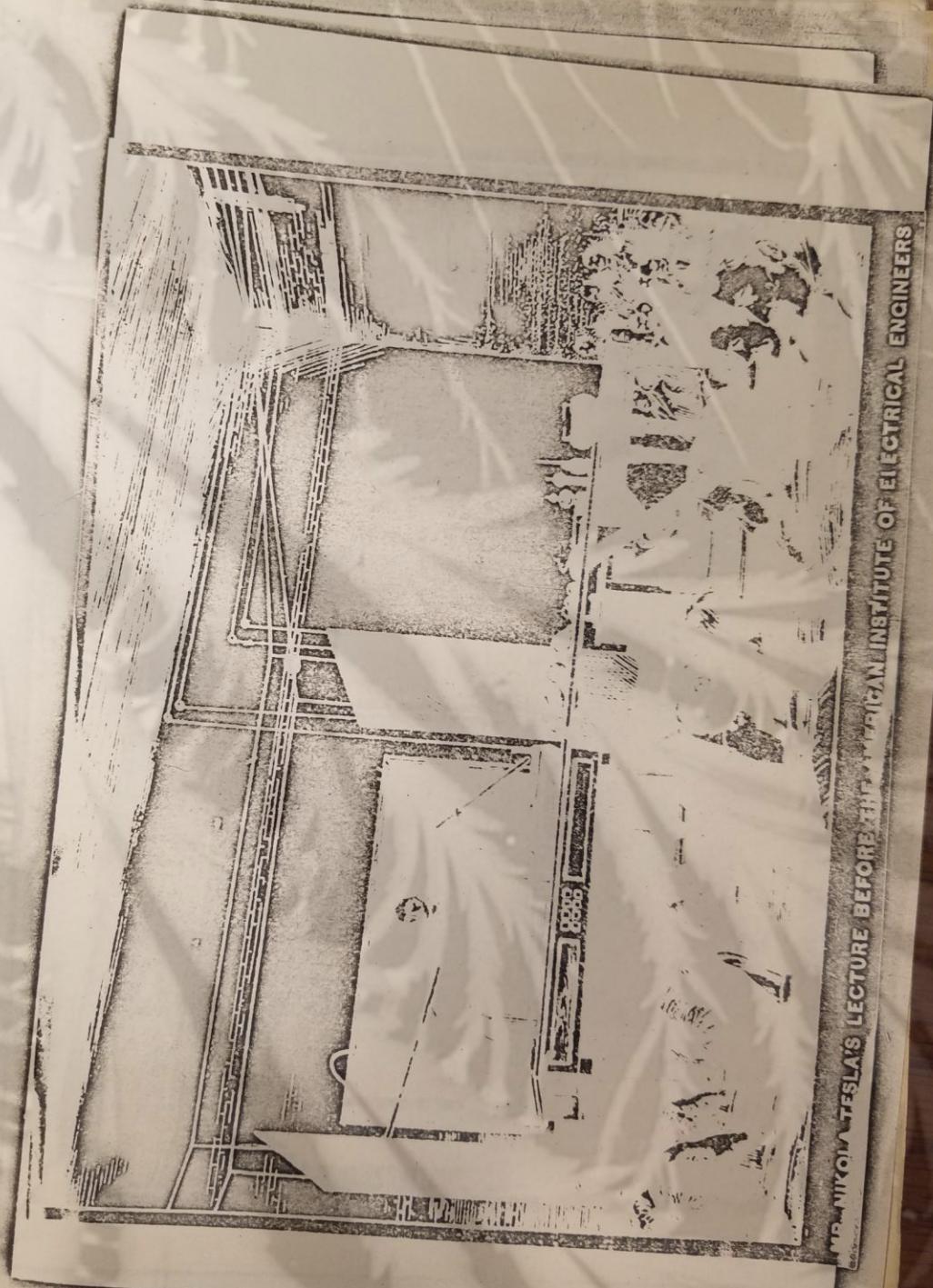
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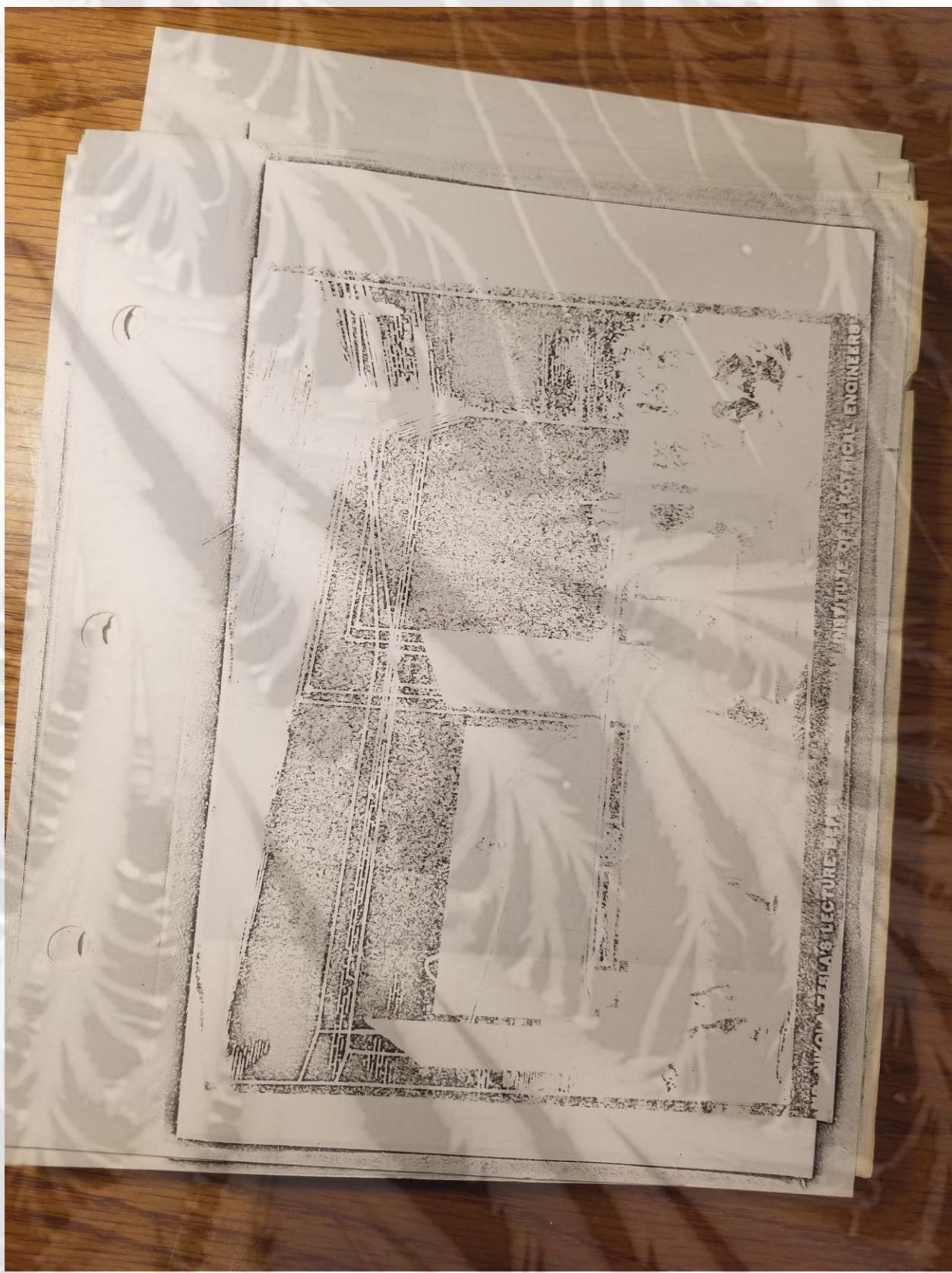
12 Photographs

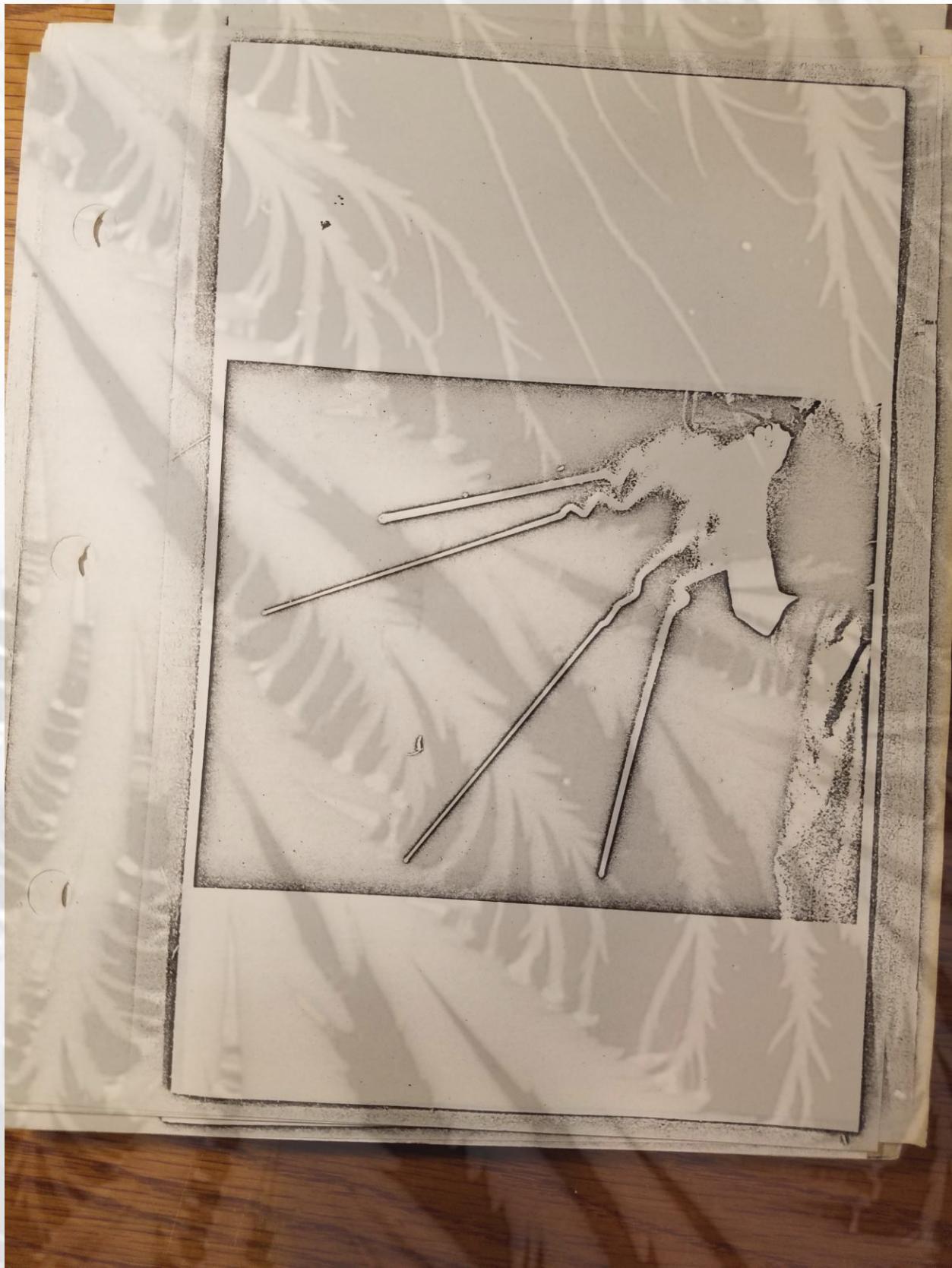
Gift of Mrs. Anne Holden Arbuckle, 1968



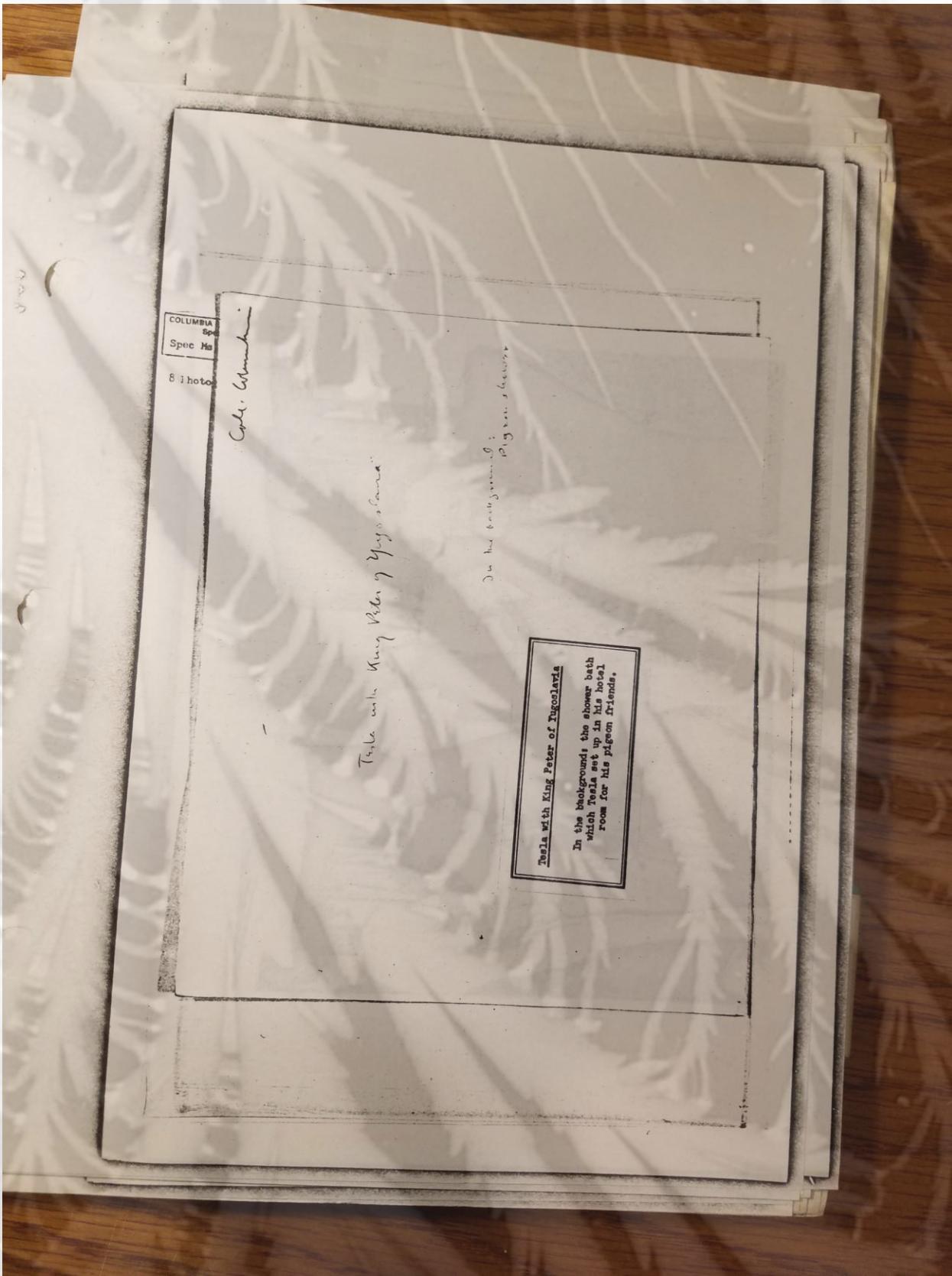


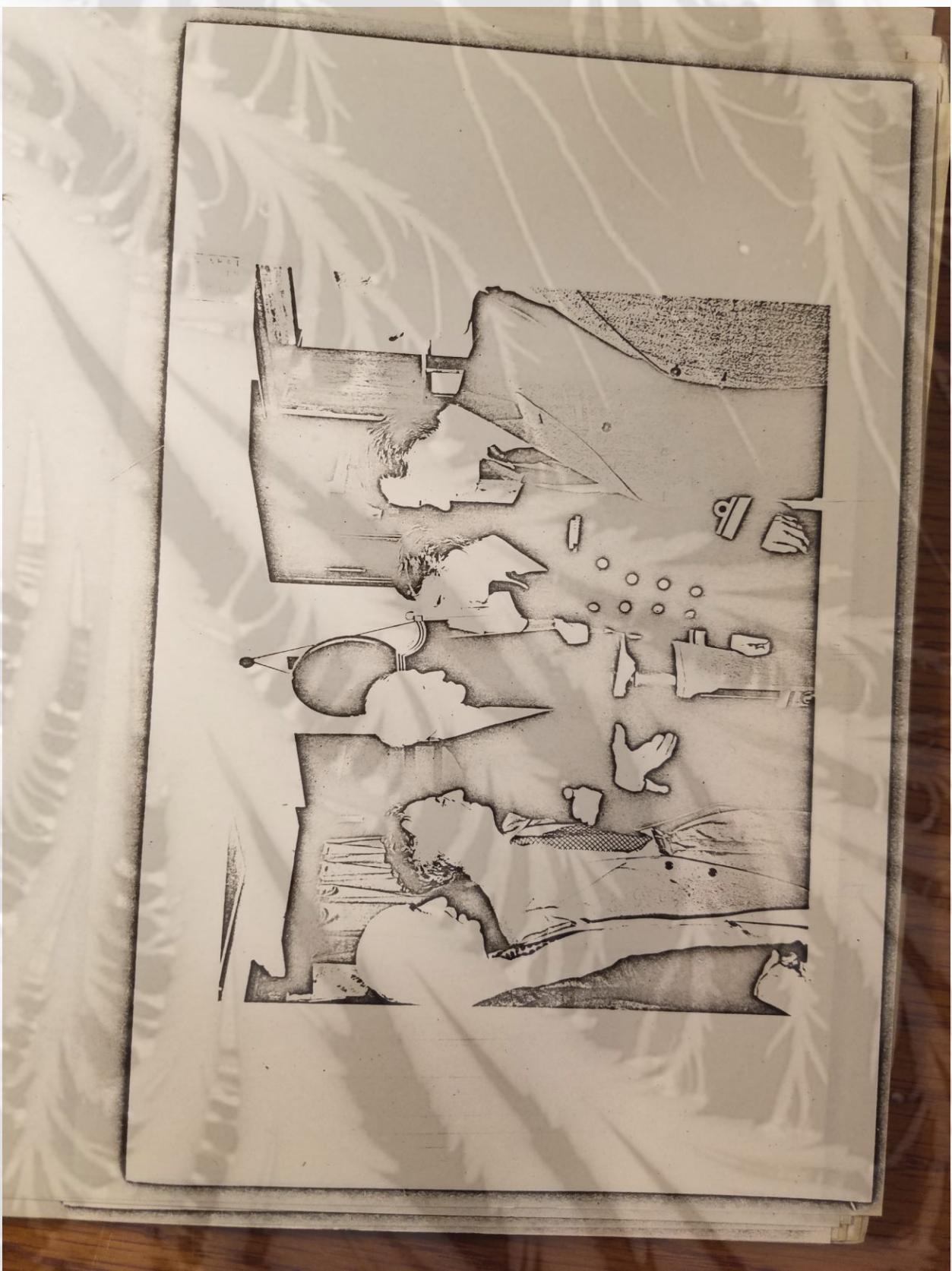








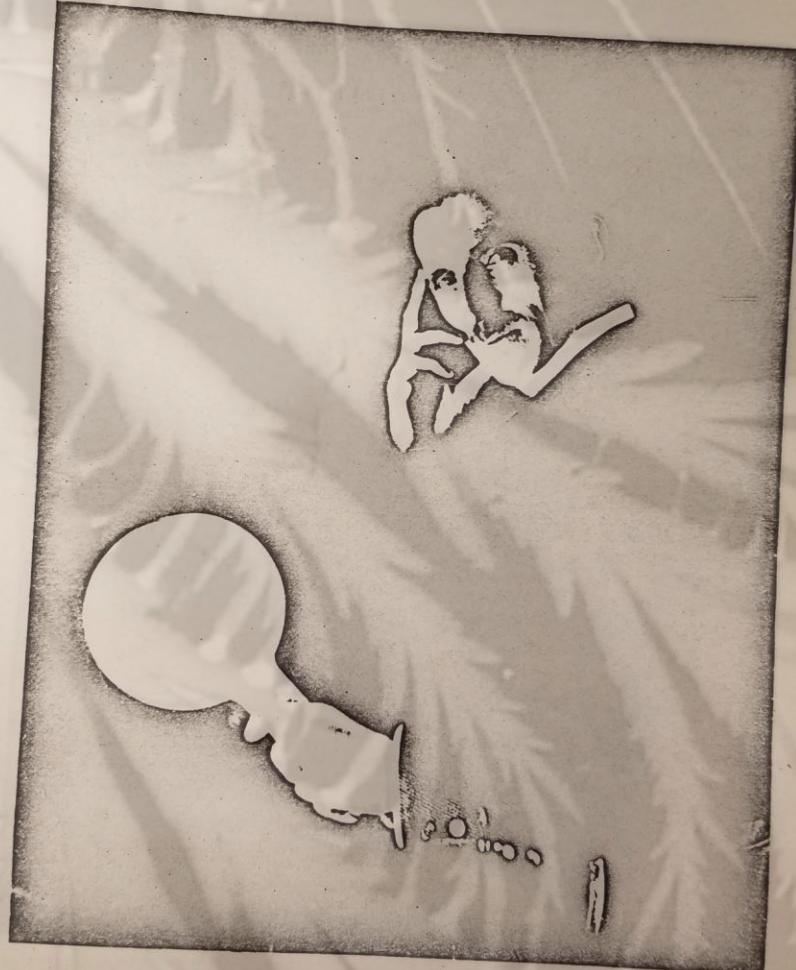


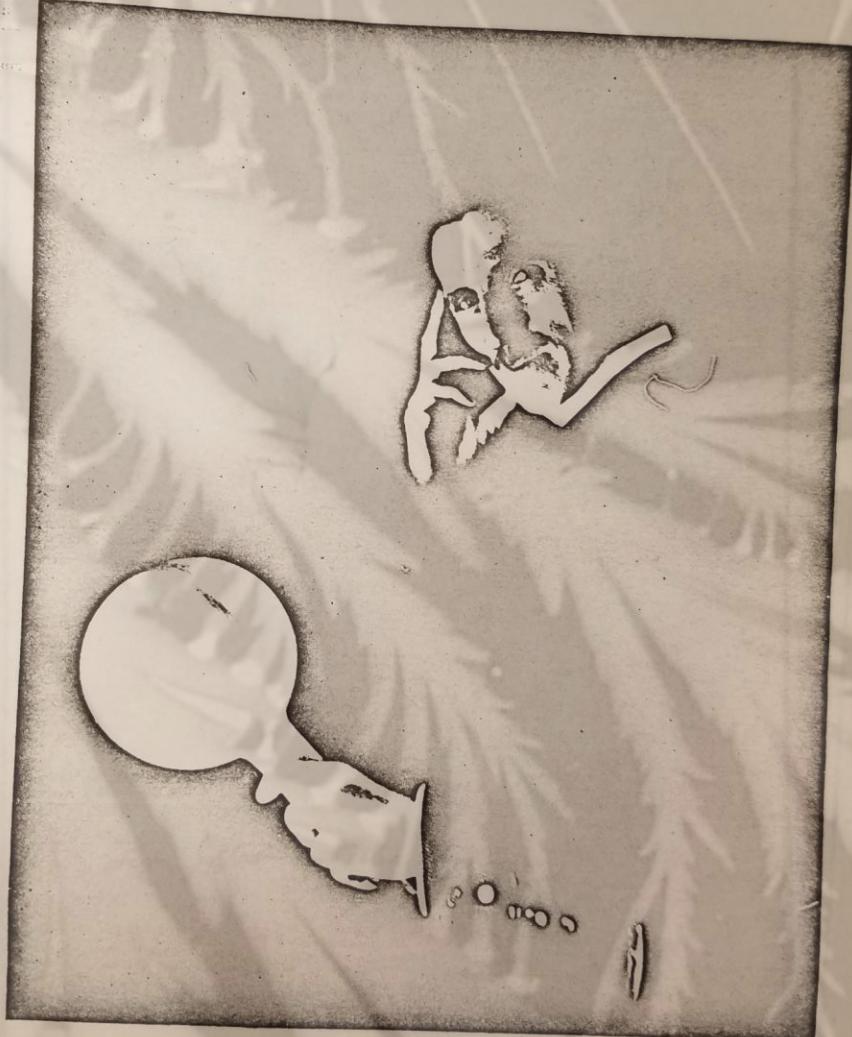


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8 Photographs

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8 Photos

Thomas Jefferson in his library





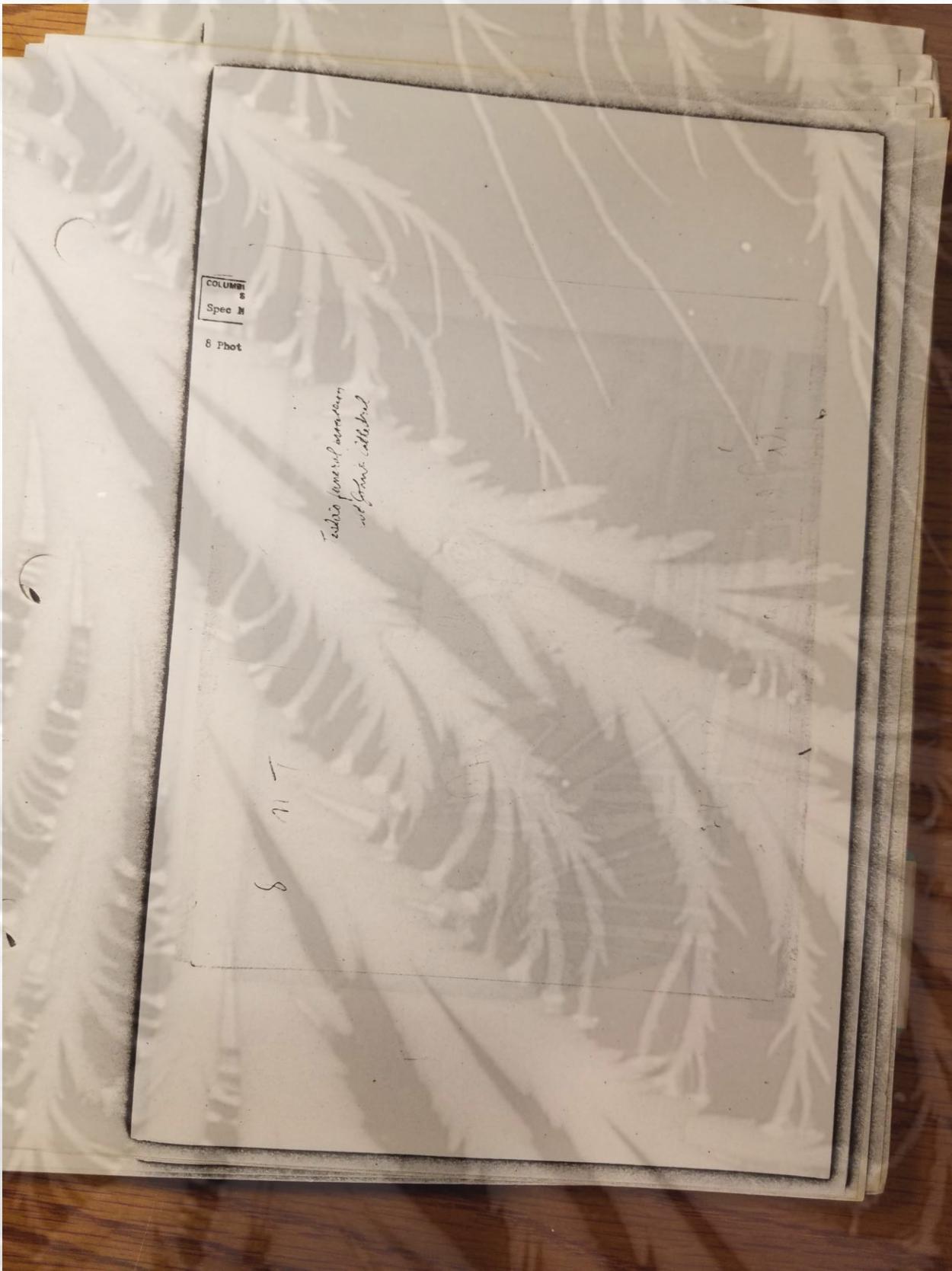
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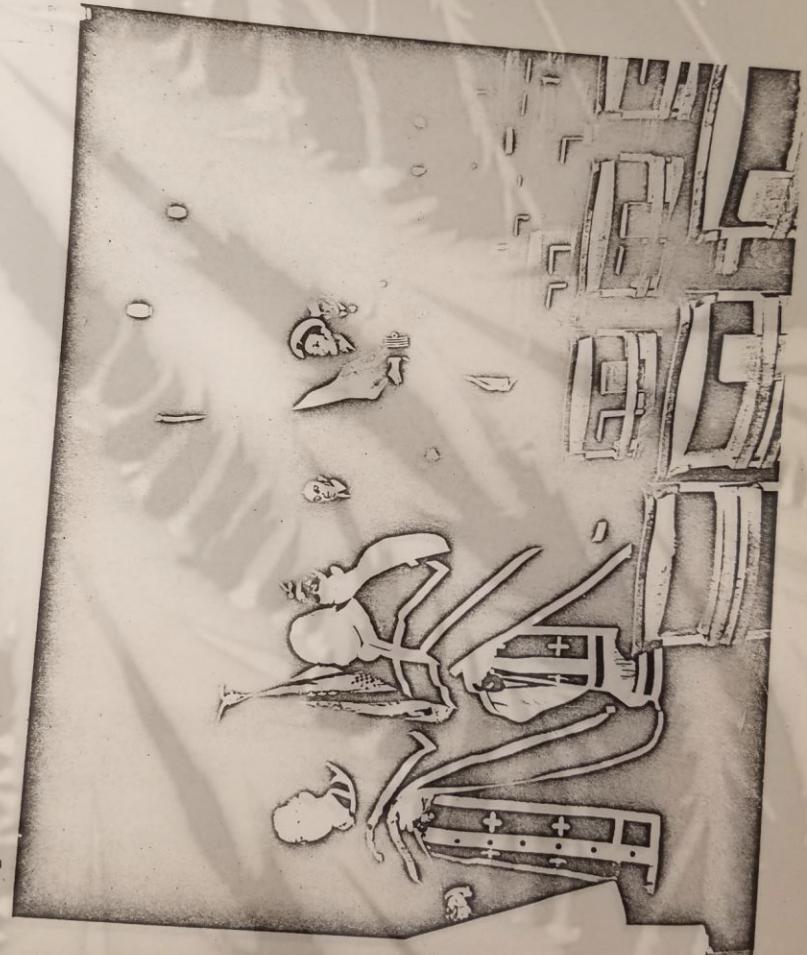
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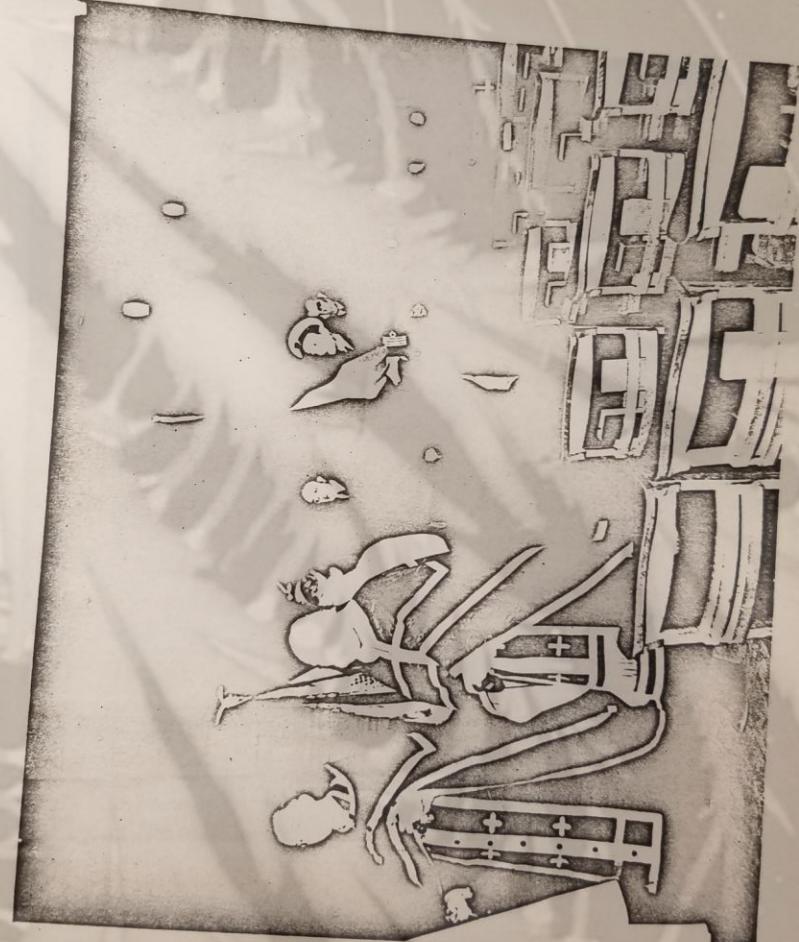
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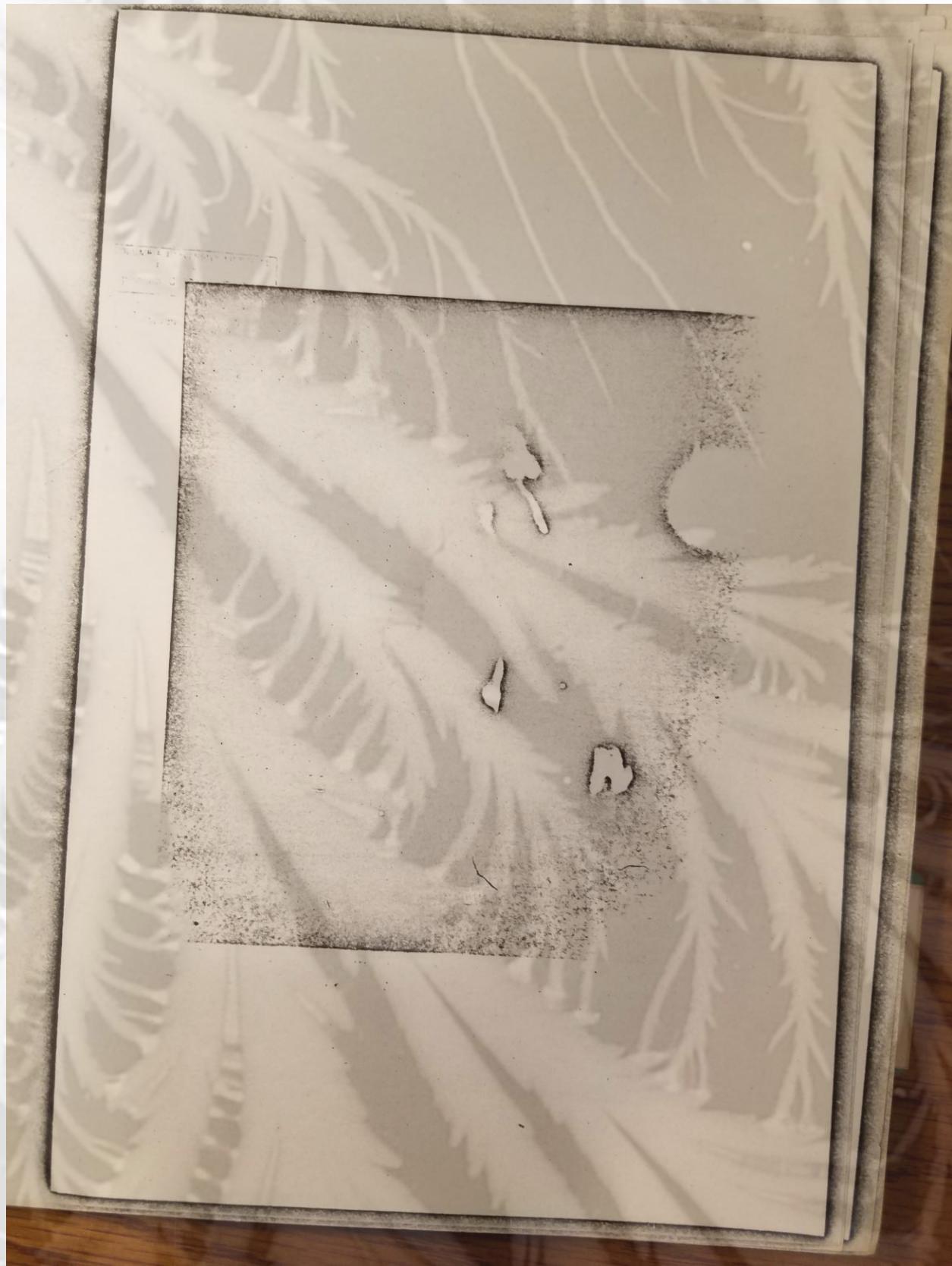
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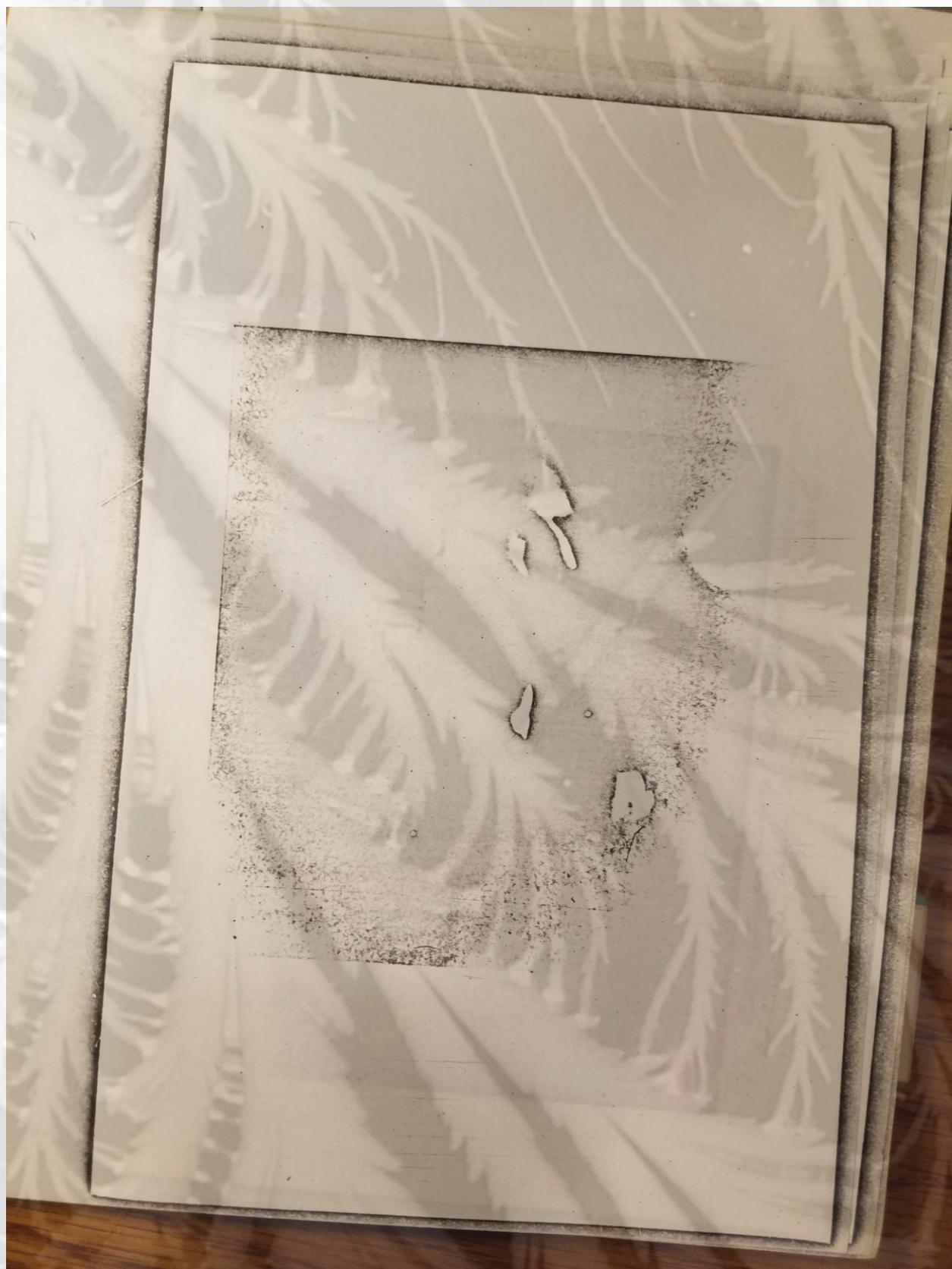


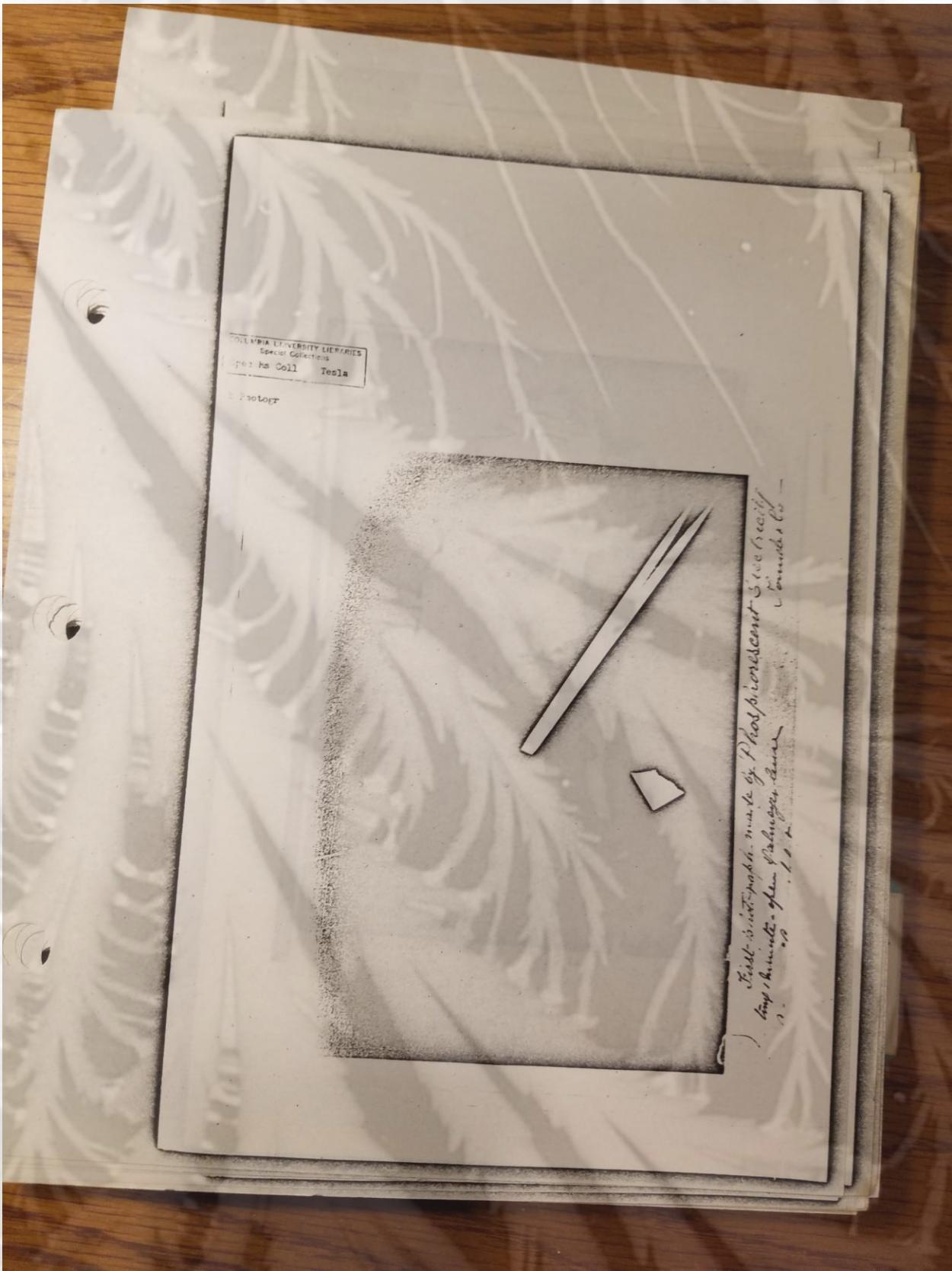


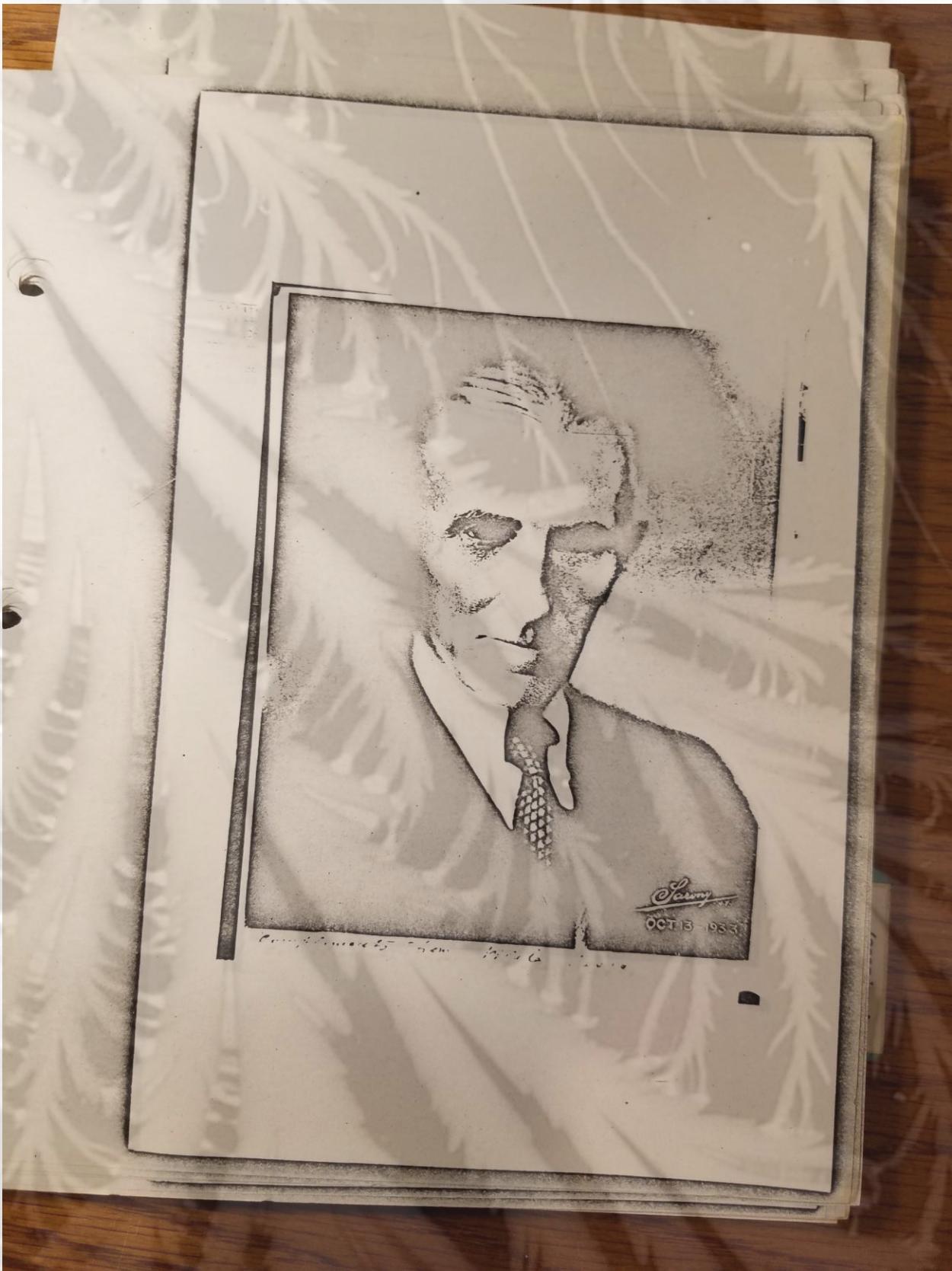




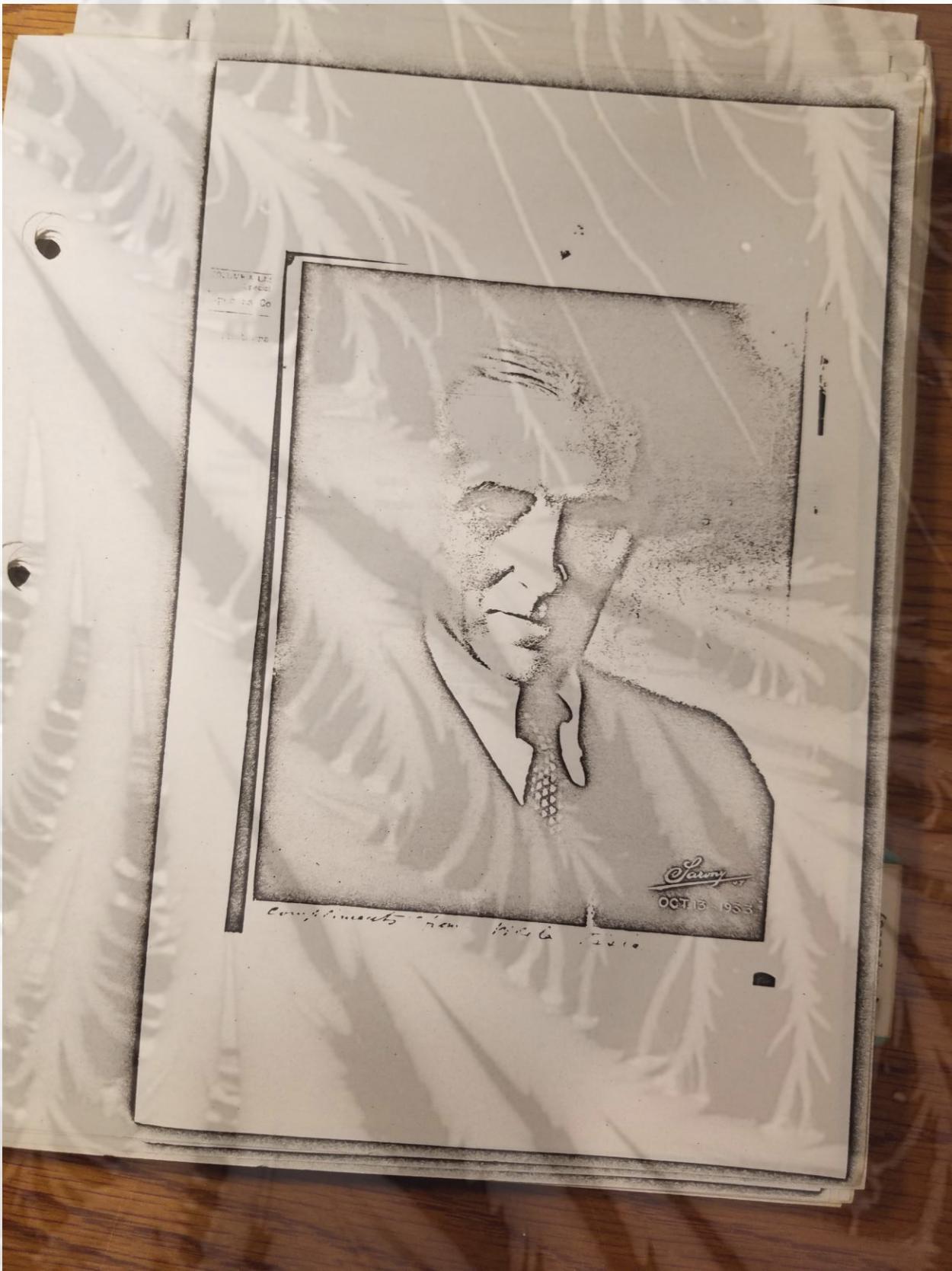












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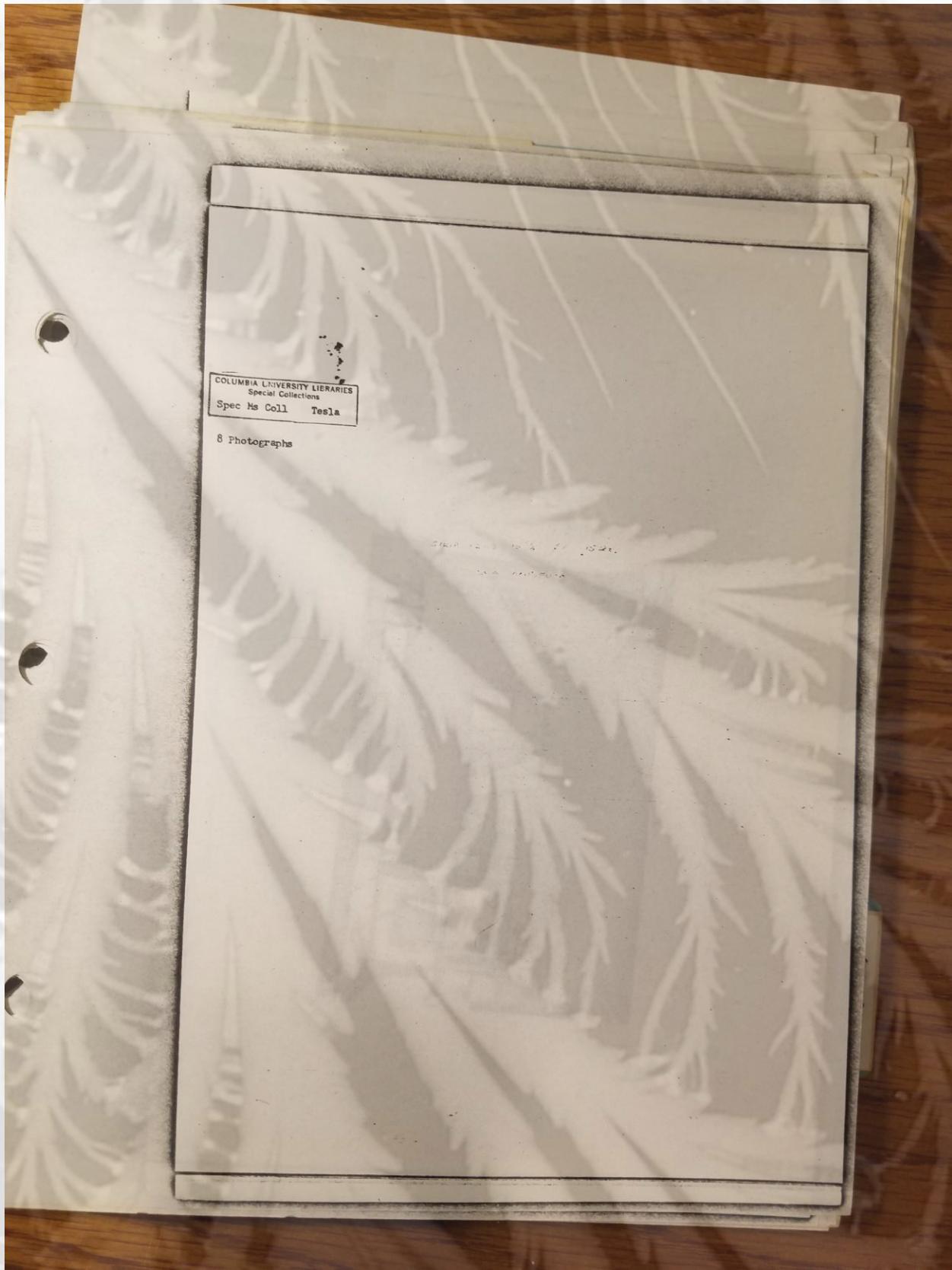
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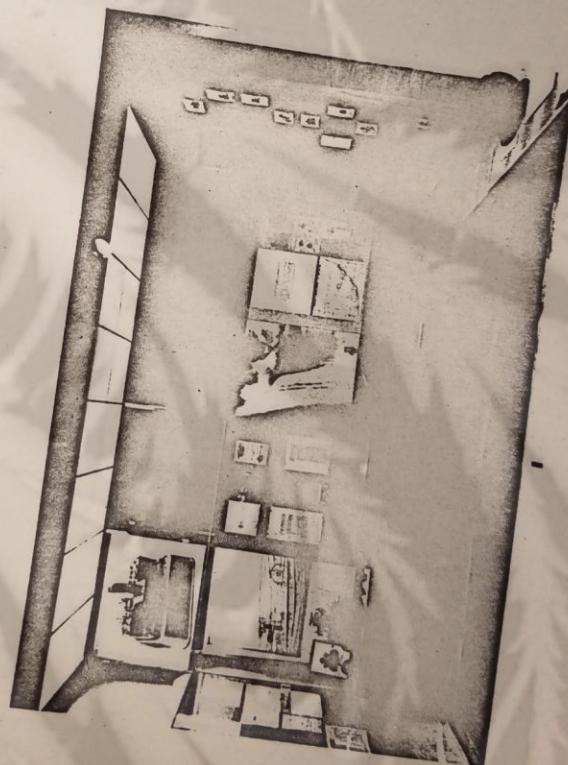


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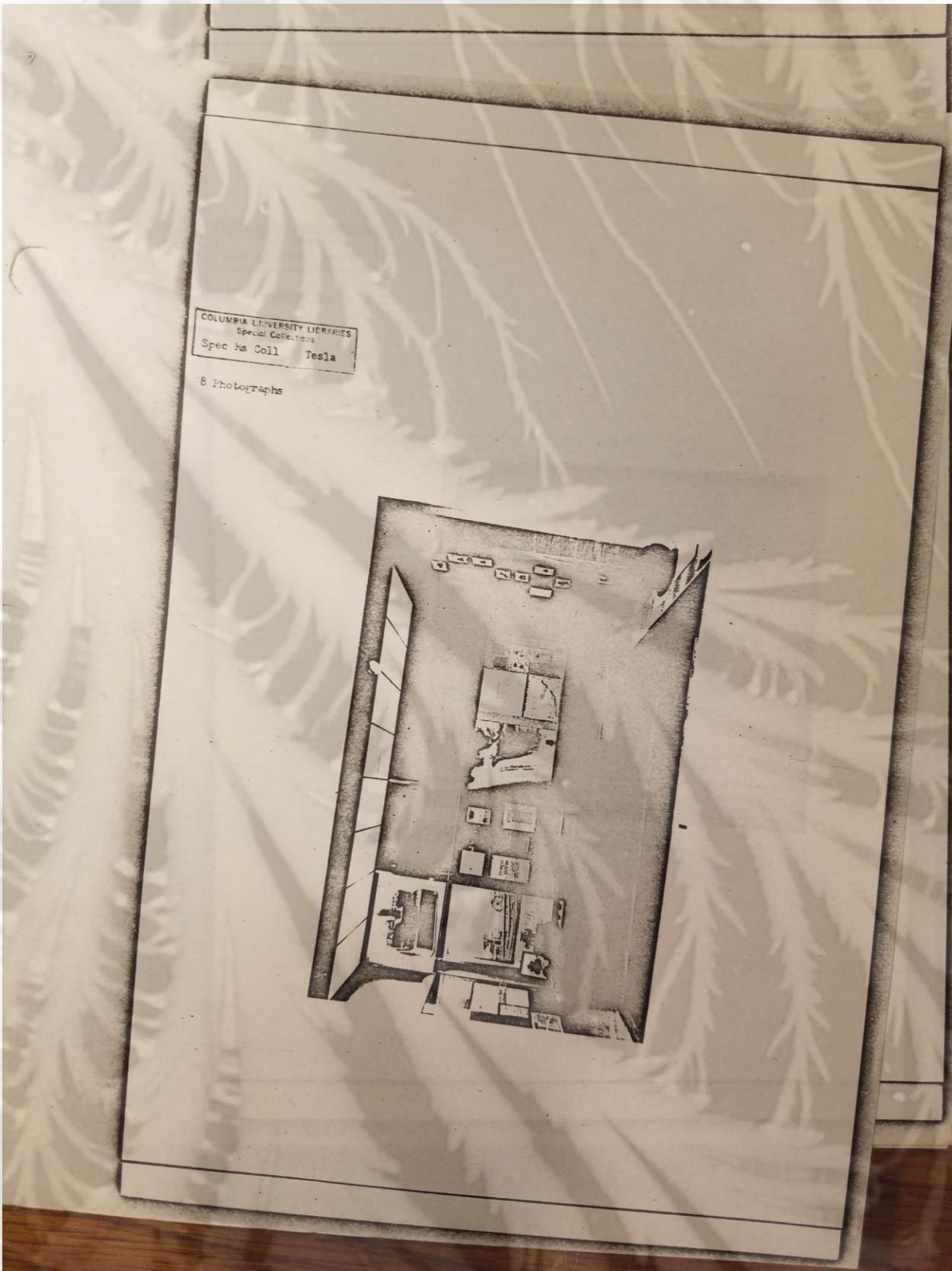
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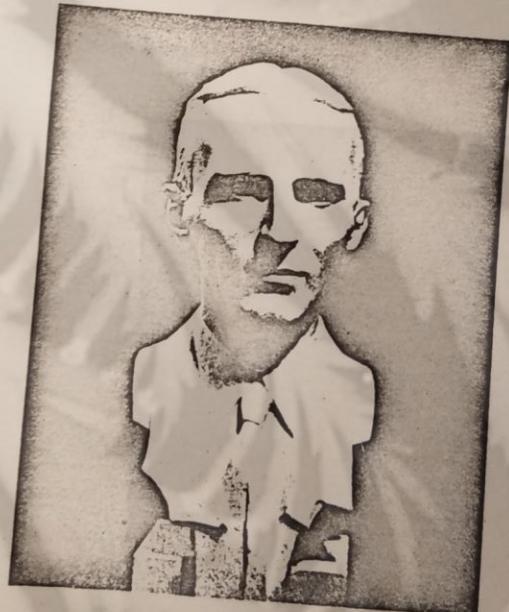


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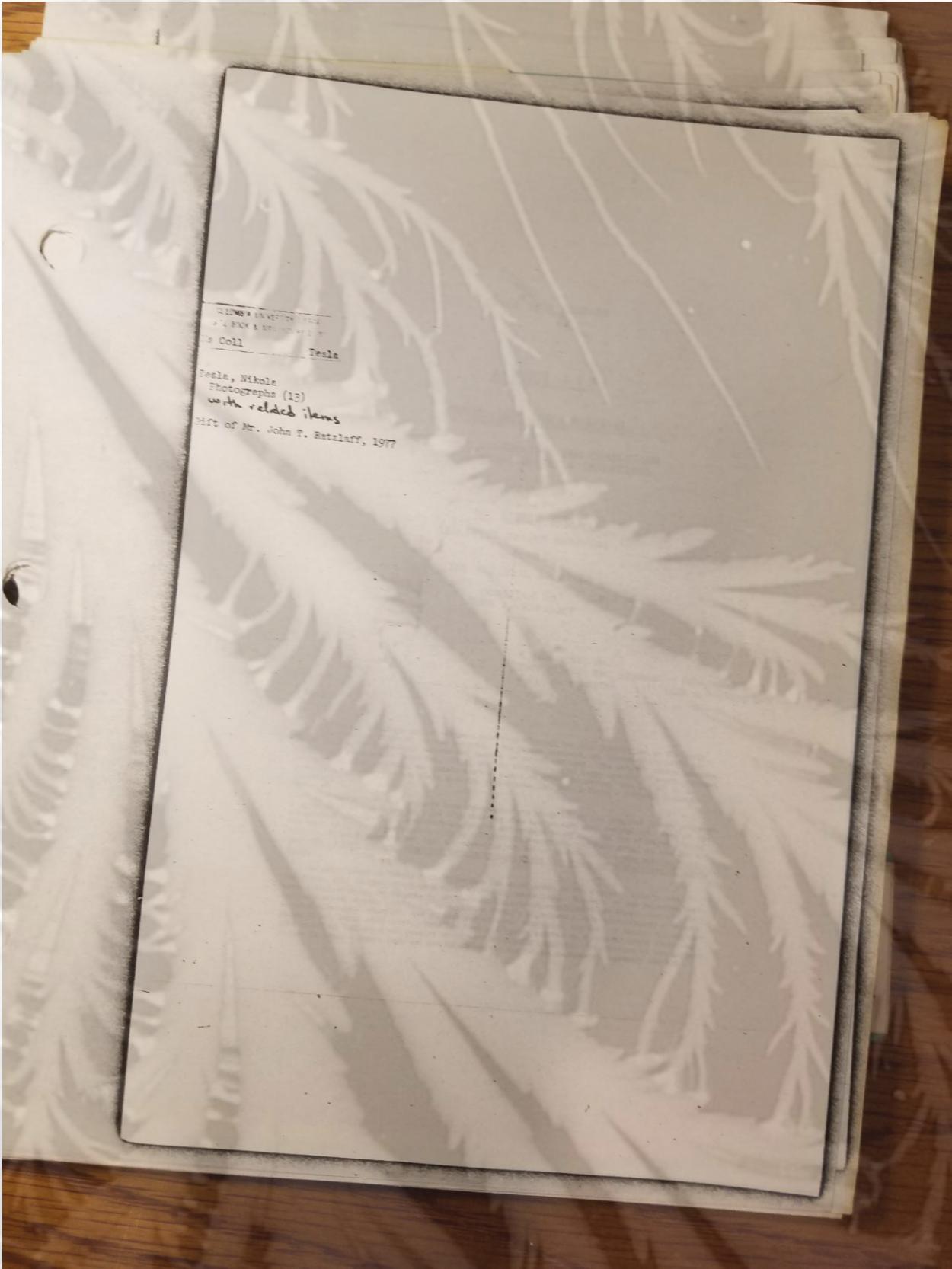
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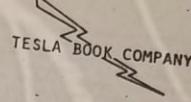






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DR. NIKOLA TESLA
SELECTED PATENT WRAPPERS
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compiled by
JOHN T. RATZLAFF

4 Vols. 922 pp.
Soft cover. GBC punched. Published 1981
L.C. No. 80-83299 ISBN 0-9603536-2-3

Twenty of the Tesla patent wrappers have been selected for this publication on the basis of importance and areas of current interest. The patent wrappers, or "patent histories", include all of the background information leading to patent issuance. The subject matter includes mechanical oscillators, turbines, radio, and the transmission of large amounts of energy without wires. The final patents, as issued, are not a part of this publication, but all 111 U.S. patents are included in the Tesla Book Co. publication, Dr. Nikola Tesla - Complete Patents (2 vols.).

This manuscript was prepared from photocopies and microfilm of the original patent wrappers. A great deal of the typed material from that era does not provide good legibility. Many of the photocopies required some darkening of letters and numbers to be suitable for printing. This was done to preserve the authenticity of the published material. In some cases, it was necessary to retype complete pages from the microfilm for better readability. These volumes represent the largest and most important work pertaining to the inventions and discoveries of Nikola Tesla.

Patents issued to Nikola Tesla represent the culmination of his creative efforts and, therefore, must be considered as a basic source of information. However, it has happened that many of the patents, as issued, do not reflect the correct explanation and completeness of detail one would expect. In trying to duplicate Tesla's experiments (the transmission of energy without wires, for example), the serious investigator encounters the lack of detail and explanation of his basic principles. This has been a frequent comment or complaint among those who have tried to duplicate the results which were originally reported. As portions of the subject matter in these volumes involved new technologies, the patent examiners frequently did not

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understand, and in many instances misinterpreted the original claims. Many of the claims were not allowed, and changes were made to satisfy the patent office examiners' comprehension of the principles involved. This resulted in the issuance of patents which were neither complete nor entirely accurate. In some cases the claims were rejected as they were thought to be inoperative. In quite a few instances Tesla's responses to the following preliminary statement: "Recite the entire specification and claims, and amendments, if any, necessary for the signatures and substitutes the following." The revised specifications were then written, an effort to explain the original concepts in different words, or when there was no recourse, to change and rewrite the application to satisfy the understanding of the patent office. The latter situation resulted in the issuance of patents in which the details were neither clear nor complete. Finally, the scope of some of the final patents has been narrowed, so that many interesting and important applications of the basic ideas are not apparent. This publication, therefore, is intended to supplement and clarify the existing patents.

It is noted that Tesla made changes in the patent application specifications to reflect new and improved ideas as the result of experimentation. This is particularly evident during and immediately following the 1899 Colorado Springs experiments.

Information contained herein provides additional detail and understanding of Tesla's other writings. A few of the important areas of interest are:

(1) Substantially more detail in the principles and construction of mechanical oscillators, bladeless turbines and pumps.

(2) Specific reference to mean velocity of energy over the face of the earth at 1.57 times the speed of light. A comment directed to the Patent Office by the patent attorneys states, "To quote a fact, intimately associated with the present subject, he [Tesla] had found that, contrary to the theory of light, which also seems to be held with the examiner, the velocity of propagation of electricity through non-conducting media is often far in excess of that given in the text books, as determined by Lord Kelvin, Kohlrausch and other authorities. He has also established that no appreciable energy can be transmitted to any considerable distance by Hertzian or electro magnetic waves, supposed to pass out at right angles to the current path in an oscillating circuit, as is now held."

(3) Explanation of standing waves, including methods of varying the period of oscillation for detection of speed and location of moving vessels.

(4) Using signals of different wavelength, "stationary" waves can be made to travel slowly over the globe, as though it were perfectly smooth.

(5) At frequencies less than 6 cycles per second, energy is not transmitted, as such, but rather the earth acts as a capacity.

(6) Separate grounds are used in relation to the stationary wave to obtain a difference in potential.

(7) Low temperature research involving flat spiral coils results in increased intensity and duration of oscillations.

The contents are of the greatest importance to the understanding of Tesla's inventions and discoveries, some of which were made nearly a century ahead of their time.

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1899-1900

By: John T. Ratzlaff and Fred A. Jost

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L.C. No. 79-67377 ISBN 0-9603536-0-7

This volume contains important supplementary information to Nikola Tesla, Colorado Springs Notes, 1899-1900. The English text of Tesla's notes unfortunately is incomplete in a number of very important details as compared to the initial Serbo-Croatian publication. After a detailed comparison of the two texts, it is the opinion of the authors that the differences and omissions are direct clues to important areas of research.

The first section of this publication deals with corrections and comments relating to the English text, and also lists some of the differences in content.

A complete summary of the commentary of Prof. Marincic, from the Serbo-Croatian text, is included in the second section. Several of the most important Tesla patents relating to the commentary have been included.

The third section is a compilation of correspondence between Nikola Tesla and his accountant, George Scherff, who was in charge of the New York laboratory during the absence of his employer. The subject matter relates directly to the Colorado Springs experiments, and adds additional detail to the 1899-1900 period.

It is intended that the supplementary information contained in this volume will provide additional insights into the important experiments conducted by Tesla, an appreciation for the total effort which was expended, and finally, a deeper understanding of the personality of this true genius.

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(First time all of Tesla's patents under one cover)

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L.C. No. 79-67722 ISBN 0-9603536-1-5

All of Nikola Tesla's patents issued in the United States are included in these two volumes. The patents show Tesla's priority in alternating current motors and generators, radio, radio control, transmission of energy without wires, and other areas of basic discovery.

The material has been arranged in chronological order by date of application, rather than by numerical sequence or subject matter. This method of presentation offers a new meaning to Tesla's work by providing a more logical sequence in following the inventive thought processes in the development of new principles, some of which are in advance of present day technology.

The Tesla patents are 111 in number, plus one reissue. Many of the available copies from the U. S. Patent Office, at 50 cents per patent, are difficult to read. The quality of the reproduction of the patents being offered in this two volume set is excellent, and at less than half the cost of patents obtained through the Patent Office.

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Responding to the need expressed by librarians and researchers throughout the country, the authors have produced this exhaustive edition of an annotated bibliography of writings by and about Nikola Tesla (1856-1943). The period covered is from 1884 through 1978. Approximately 3,000 citations are included, arranged chronologically, plus a complete list of U. S. patents granted to Tesla, arranged by date of application. All earlier, lessor bibliographic efforts have been merged in this edition, with both North American and European sources cited. In addition to searching periodical directories and newspaper indexes, complete runs of 23 serials were examined for content; morgue files were searched for unindexed newspapers; Tesla's estate papers were searched for reference to obscure published articles; clipping files in major institutional and public libraries were examined.

All articles, whether being found in multiple sources or having only minor significance, have been cited. A short biography is included. The chronological arrangement will be an aid to the user in following the sequence of Tesla's life, scientific discoveries, and accomplishments.

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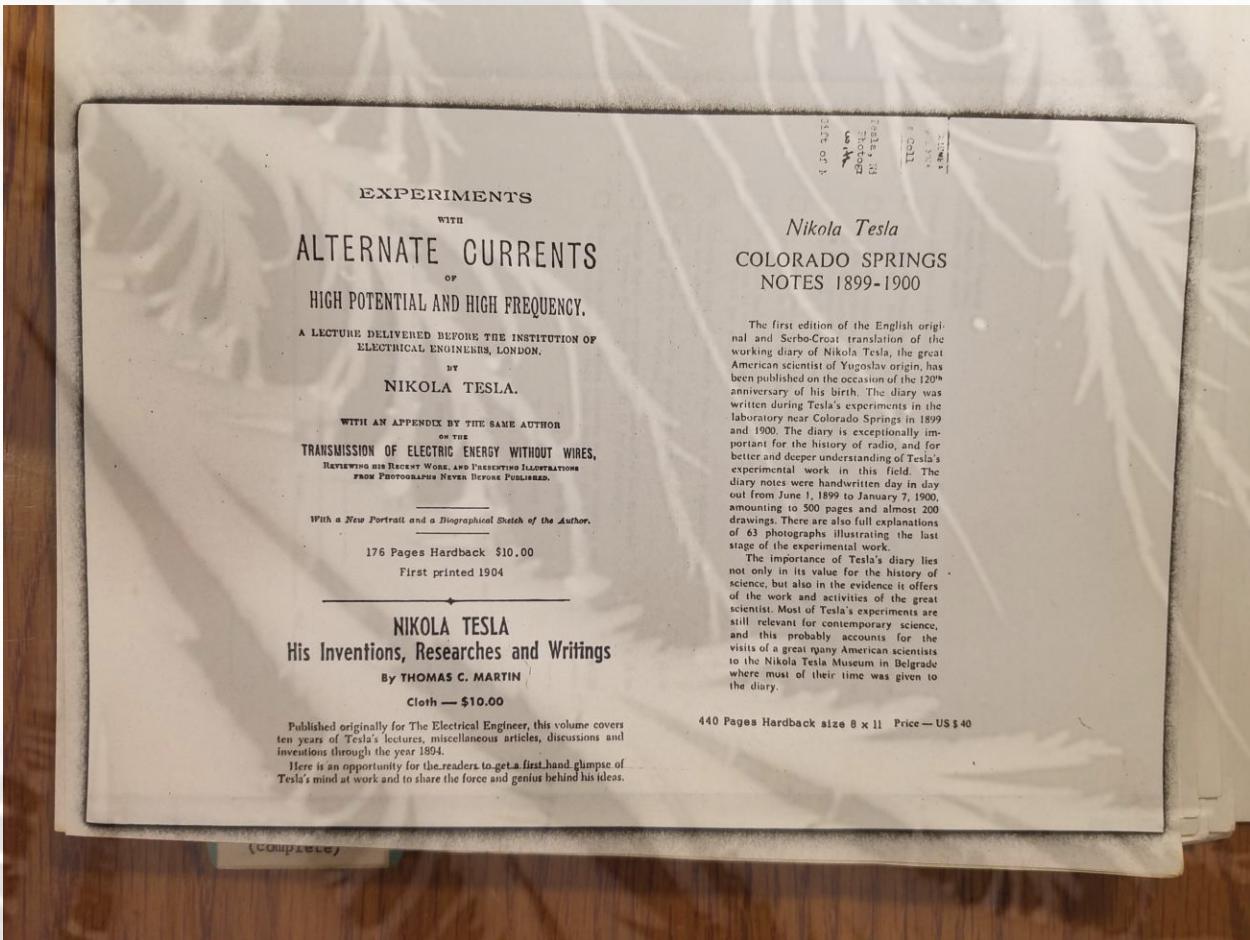
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BY

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Nikola Tesla

COLORADO SPRINGS
NOTES 1899-1900

The first edition of the English original and Serbo-Croat translation of the working diary of Nikola Tesla, the great American scientist of Yugoslav origin, has been published on the occasion of the 120th anniversary of his birth. The notes were written during Tesla's experiments in the laboratory near Colorado Springs in 1899 and 1900. The diary is exceptionally important for the history of radio, and for better and deeper understanding of Tesla's experimental work in this field. The diary notes were handwritten day in day out from June 1, 1899 to January 7, 1900, amounting to 500 pages and almost 200 drawings. There are also full explanations of 63 photographs taken in the last stage of the experimental work.

The importance of Tesla's diary lies not only in its value for the history of science, but also in the evidence it offers of the work and activities of the great scientist. Most of Tesla's experiments are still relevant for contemporary science, and this probably accounts for the visits of a great many American scientists to the Nikola Tesla Museum in Belgrade where most of their time was given to the diary.

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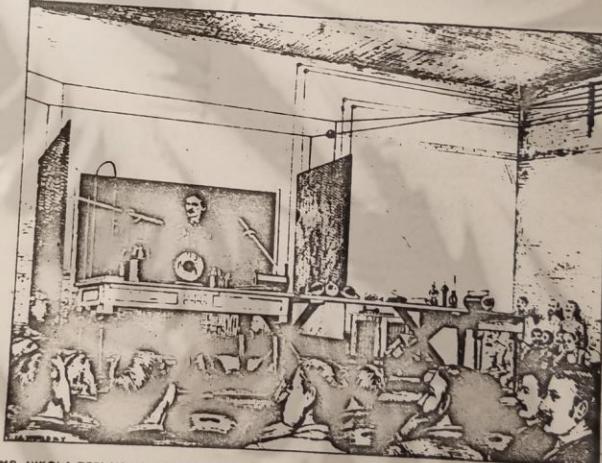
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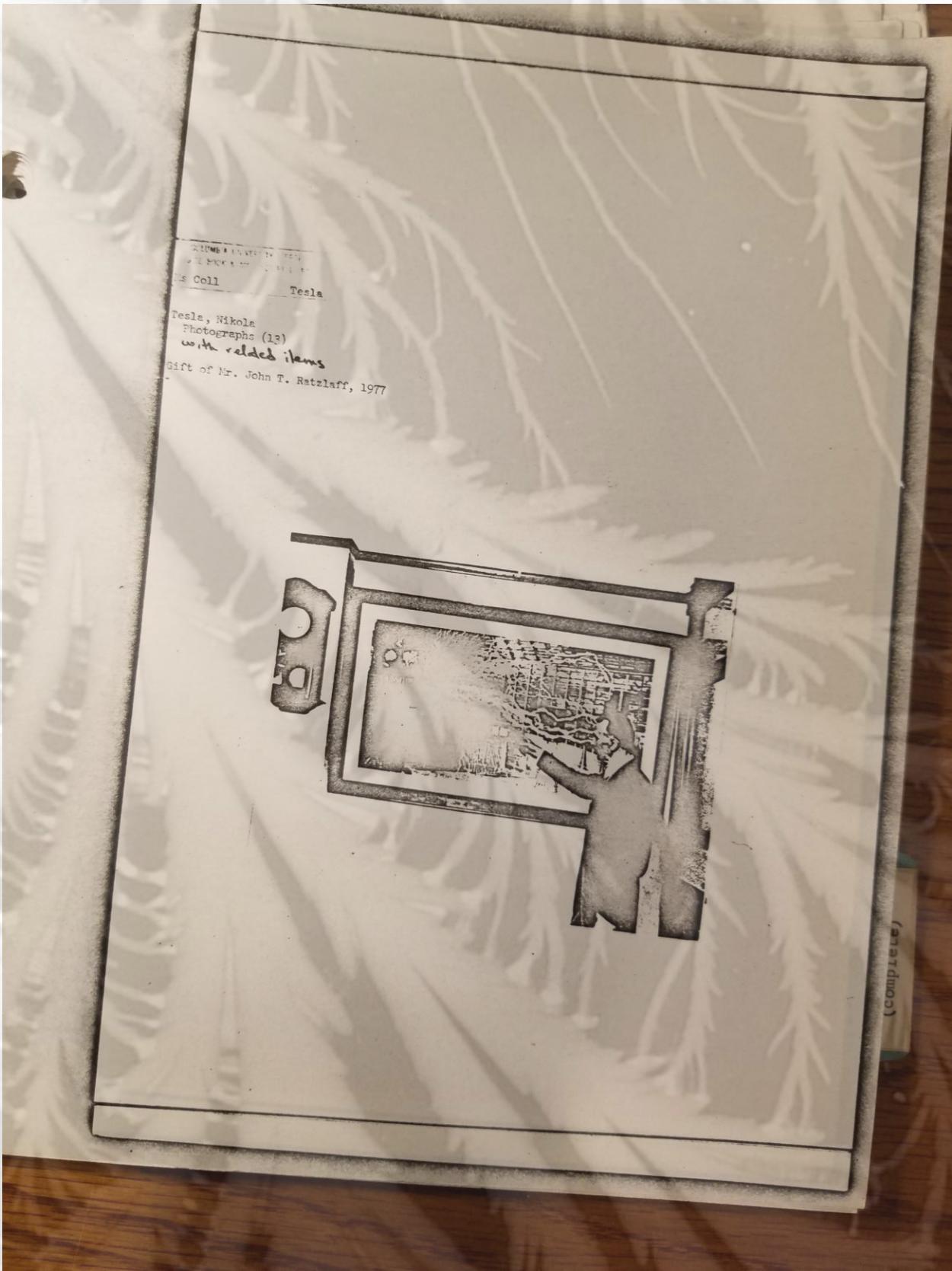
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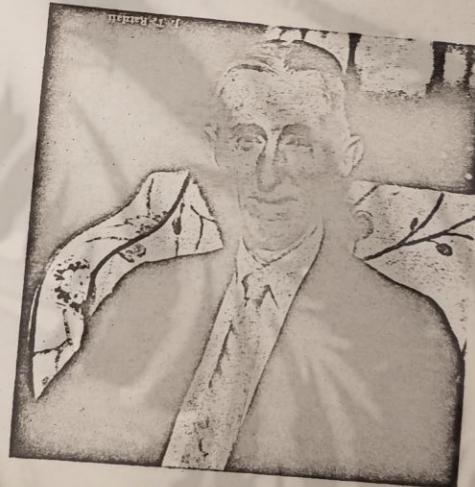
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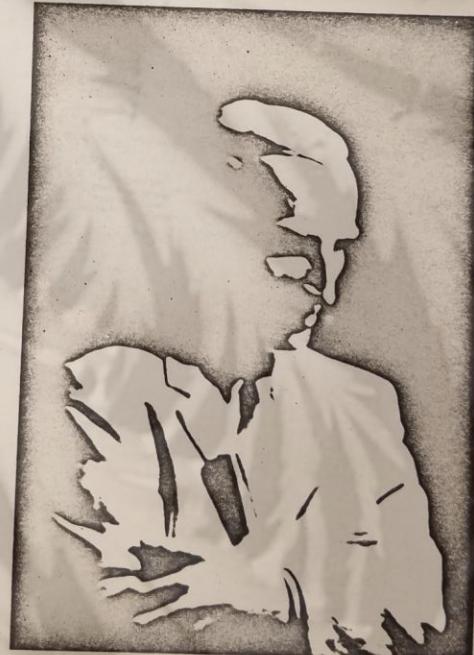
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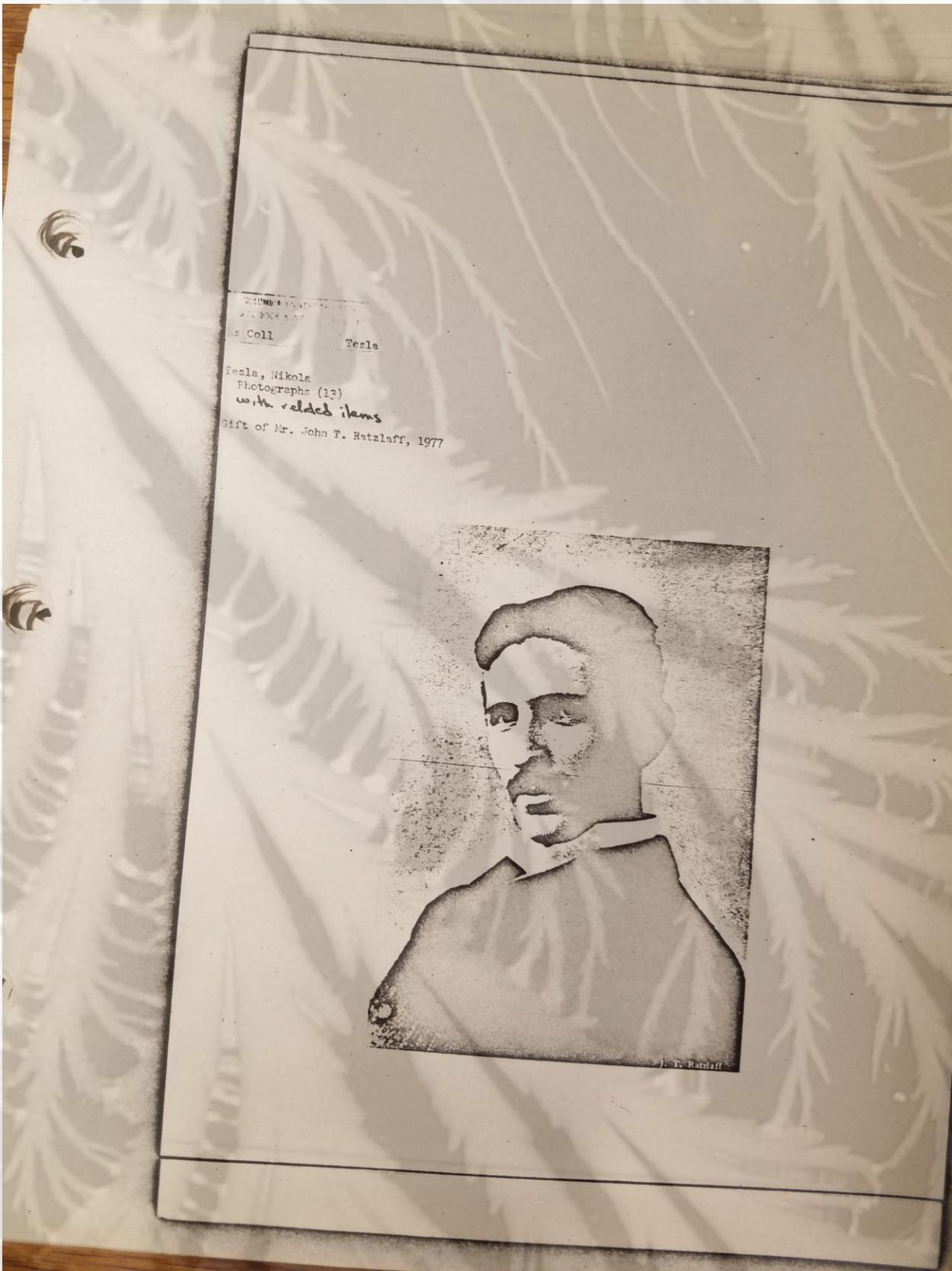
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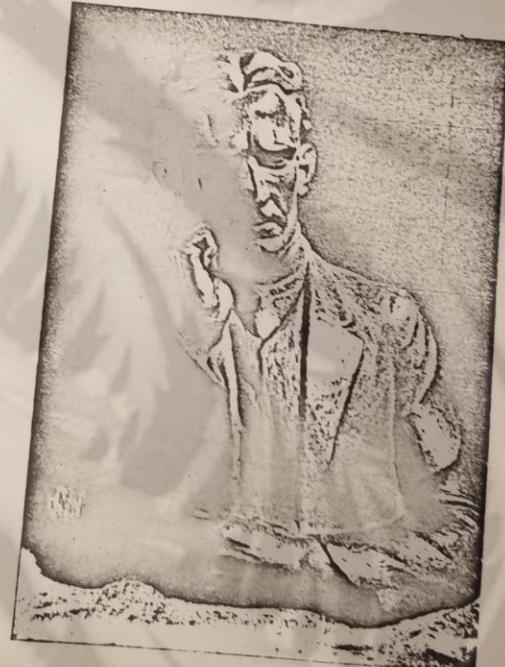
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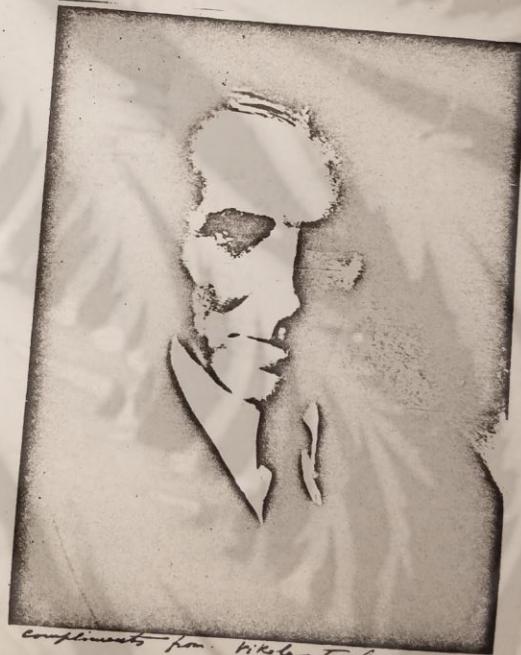
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Elect. Review - London
May 3, 1885

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FIG. 4.—“SOME EXPERIMENTS IN TESLA'S LABORATORY WITH CURRENTS OF HIGH POTENTIAL AND HIGH FREQUENCY.”

The operator's body, in this experiment, is charged to a high potential by means of a coil responsive to the waves transmitted to it from a distant oscillator, and a long glass tube waved in the hand is lighted to great brilliancy by the electrical charges conveyed to it through the body.

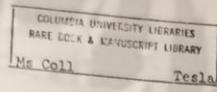
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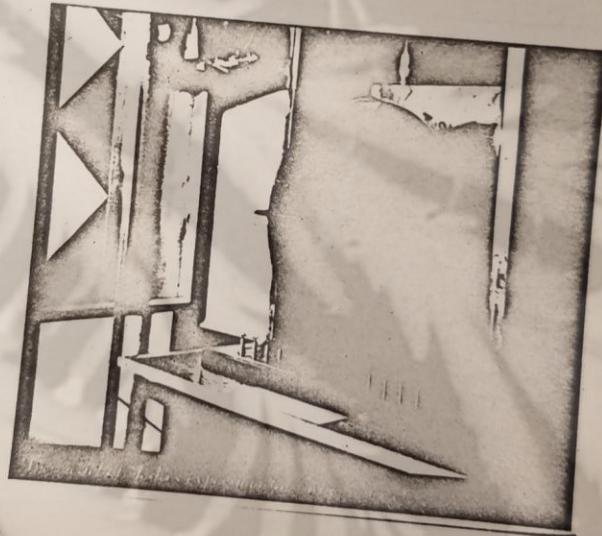
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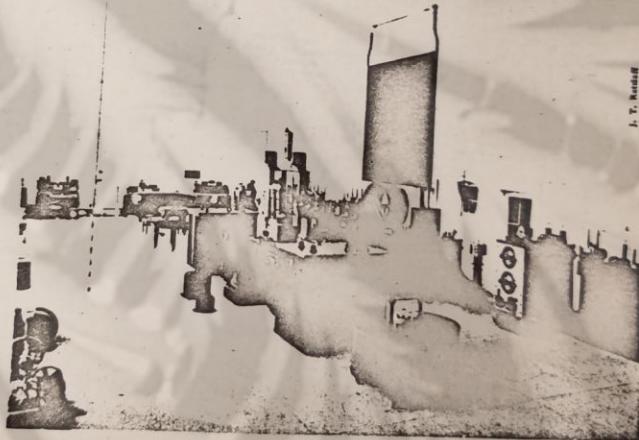
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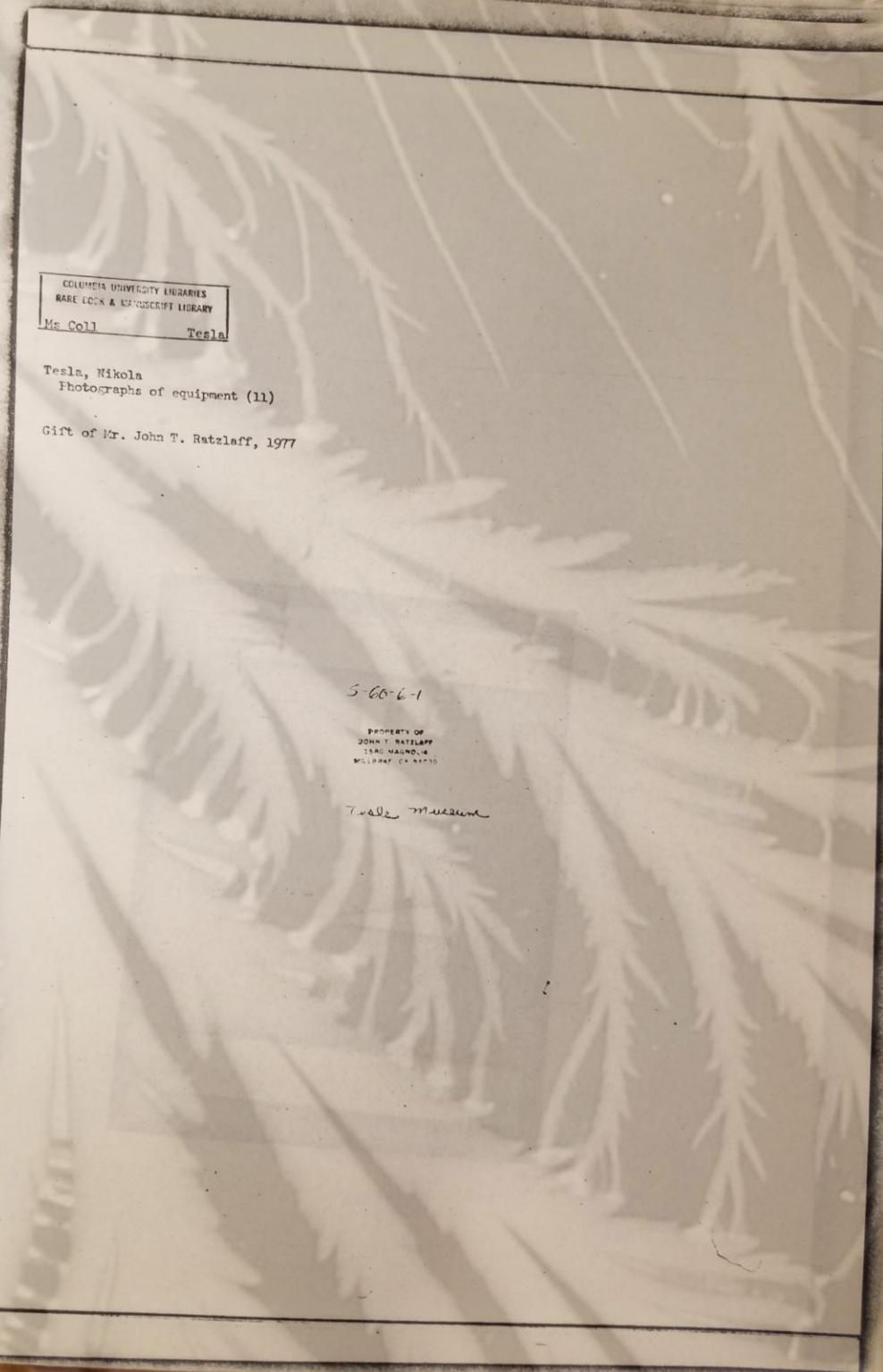
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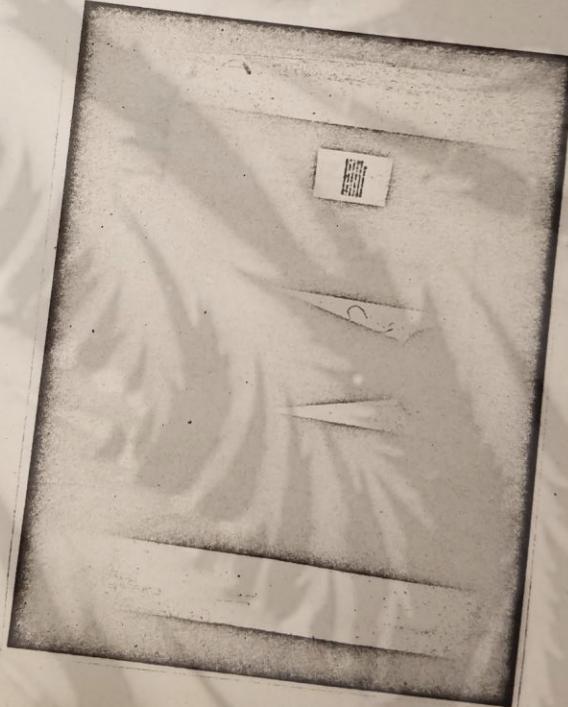
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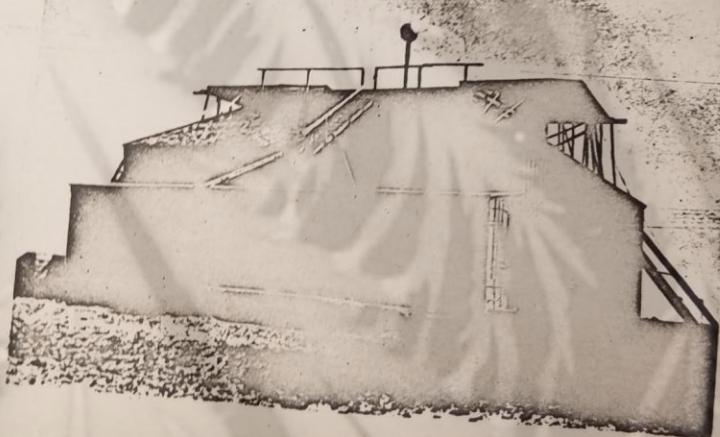
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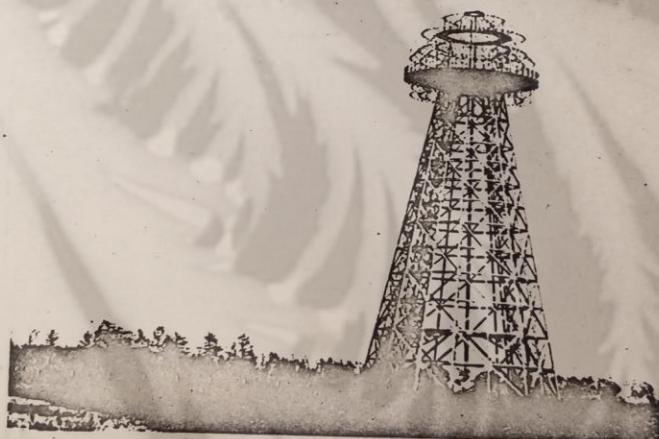
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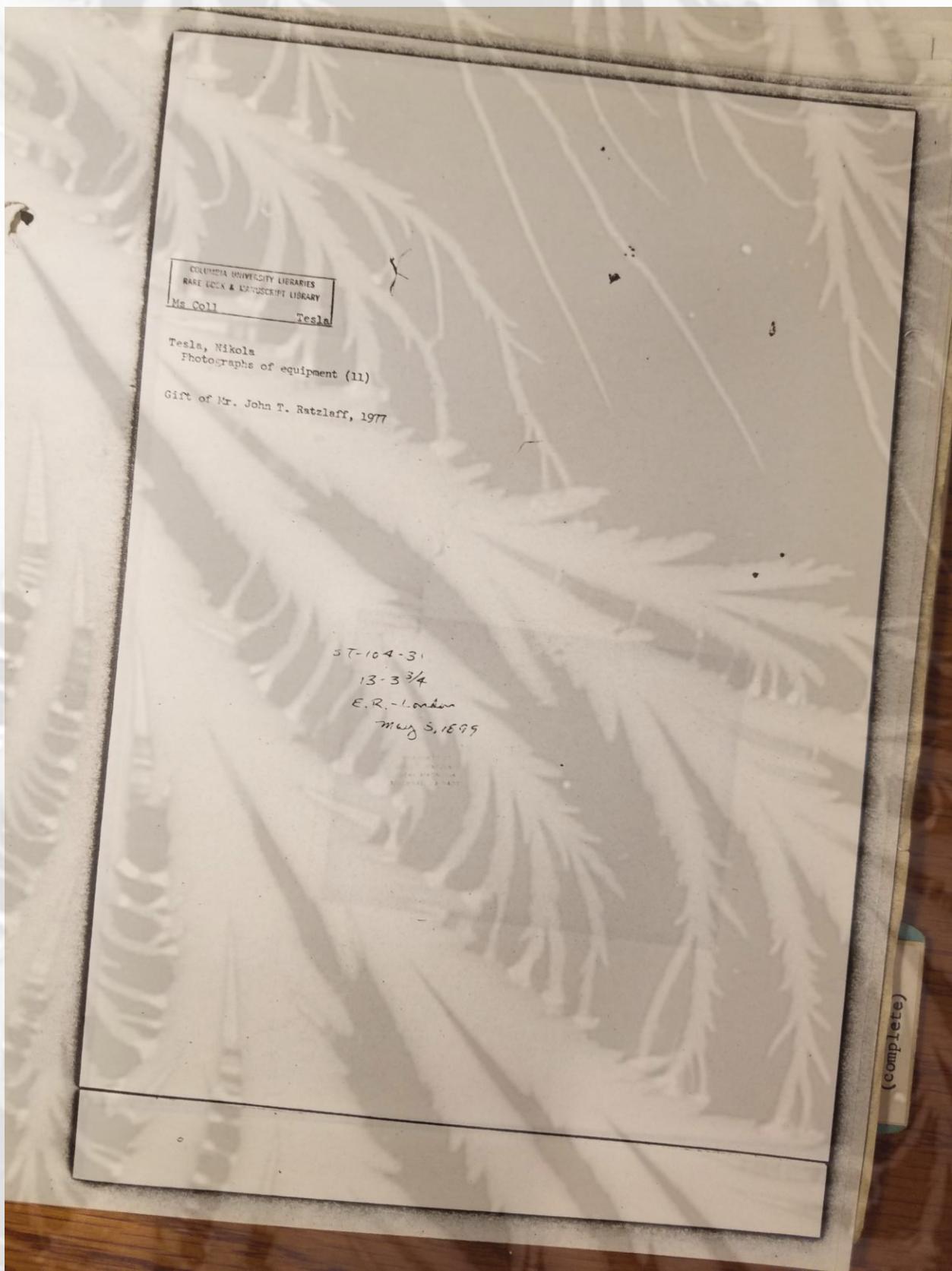
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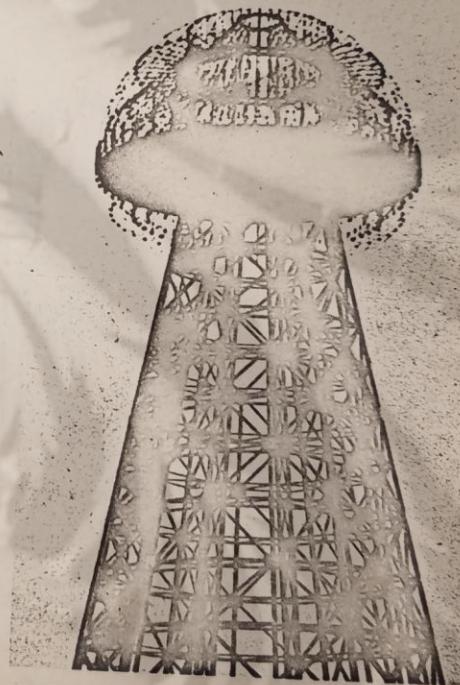
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No. 787,412.

PATENTED APR. 18, 1905.

N. TESLA.
ART OF TRANSMITTING ELECTRICAL ENERGY THROUGH THE NATURAL
MEDIUMS.

APPLICATION FILED MAY 16, 1900. RENEWED JUNE 17, 1908.

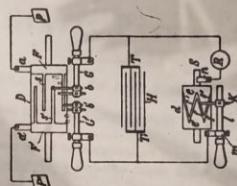


Fig. 2

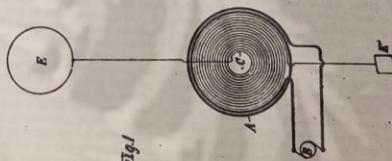


Fig. 1

Witnesses:
Raphael Hitter
M. Leman Dyer.

Nikola Tesla Inventor
by Ken Lay & Co Inc Atty's

To my friends Mr. Filipov's 4th had years

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Clippings,

No. 787,412.

Patented April 16, 1905.

UNITED STATES PATENT OFFICE.

NIKOLA TESLA, OF NEW YORK, N. Y.

ART OF TRANSMITTING ELECTRICAL ENERGY THROUGH THE NATURAL MEDIUMS.

SPECIFICATION forming part of Letters Patent No. 787,412, dated April 16, 1905.

Application filed May 16, 1900. Renewed June 17, 1902. Serial No. 112,034.

To all whom it may concern:

Be it known that I, NIKOLA TESLA, a citizen of the United States, residing in the borough of Manhattan, in the city, county, and State of New York, have discovered a new and useful Improvement in the Art of Transmitting Electrical Energy Through the Natural Media, of which the following is a specification, reference being had to the drawings accompanying and forming a part of the same:

It is known since a long time that electric currents may be propagated through the earth, and this knowledge has been utilized in many ways in the transmission of signals and the operation of a variety of receiving devices remote from the source of energy, mainly with the object of dispensing with a return conducting-wire. It is also known that electrical disturbances may be transmitted through portions of the earth by grounding only one of the poles of the source, and this fact I have made use of in systems which I have devised for the purposes of transmitting through the natural media intelligible signals or power and which are now familiar; but all experiments and observations heretofore made have tended to confirm the opinion held by the majority of scientific men that the earth, owing to its immense extent, although possessing conducting properties, does not behave in the manner of a conductor of limited dimensions with respect to the disturbances produced, but, on the contrary, much like a vast reservoir or ocean, while it may be locally disturbed by a commotion of some kind remains unresponsive and quiescent in a large part or as a whole. Still another fact now of common knowledge is that when electrical waves or oscillations are impressed upon such a conducting-path as a metallic wire reflection takes place under certain conditions from the ends of the wire, and in consequence of the interference of the impressed and reflected oscillations the phenomenon of "stationary waves" with maxima and minima in definite fixed positions is produced. In any case the existence of these waves indicates that some of the outgoing waves have reached the boundaries of the conducting-path and have been reflected from the same. Now I have

discovered that notwithstanding its vast dimensions and contrary to all observations heretofore made the terrestrial globe may in a large part or as a whole behave toward disturbances impressed upon it in the same manner as a conductor of limited size, this fact being demonstrated by novel phenomena, which I shall hereinafter describe.

In the course of certain investigations which I carried on for the purpose of studying the effects of lightning discharges upon the electrical condition of the earth I observed that sensitive receiving instruments arranged so as to be capable of responding to electrical disturbances created by the discharges at times failed to respond when they should have done so, and upon inquiring into the causes of this unexpected behavior I discovered it to be due to the character of the electrical waves which were produced in the earth by the lightning discharges and which had nodal regions following at definite distances the shifting source of the disturbances. From data obtained in a large number of observations of the maxima and minima of these waves I found their length to vary approximately from twenty-five to seventy kilometers, and these results and certain theoretical deductions led me to the conclusion that waves of this kind may be propagated in all directions over the globe and that they may be of still more widely differing lengths, the extreme limits being imposed by the physical dimensions and properties of the earth. Recognizing in the existence of these waves an unmistakable evidence that the disturbances created had been conducted from their origin to the most remote portions of the globe and had been thence reflected, I conceived the idea of producing such waves in the earth by artificial means with the object of utilizing them for many useful purposes for which they are or might be found applicable. This problem was rendered extremely difficult owing to the immense dimensions of the planet, and consequently enormous movement of electricity or rate at which electrical energy had to be delivered in order to approximate, even in a remote degree, movements or rates which are manifestly attained in the displays of elec-

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787,412

trical forces in nature and which seemed at first unrealizable by any human agencies; but by gradual and continuous improvements of a generator of electrical oscillations, which I have described in my Patents Nos. 645,576 and 649,621, I finally succeeded in reaching electrical movements or rates of delivery of electrical energy not only approximating, but, as shown in many comparative tests and measurements, actually surpassing those of lightning discharges, and by means of this apparatus I have found it possible to reproduce whenever desired phenomena in the earth the same as or similar to those due to such discharges. With the knowledge of the phenomena discovered by me and the means at command for accomplishing these results I am enabled not only to carry out many operations by the use of known instruments, but also to offer a solution for many important problems involving the operation or control of remote devices which for want of this knowledge and the absence of these means have heretofore been entirely impossible. For example, by the use of such a generator of stationary waves and receiving apparatus properly placed and adjusted in any other locality, however remote, it is practicable to transmit intelligible signals or to control or actuate at will any one or all of such apparatus for many other important and valuable purposes, as for indicating wherever desired the correct time of an observatory or for ascertaining the relative position of a body or distance of the same with reference to a given point or for determining the course of a moving object, such as a vessel at sea, the distance traversed by the same or its speed, or for producing many other useful effects at a distance dependent on the intensity, wave length, direction or velocity of movement, or other features or property of disturbances of this character.

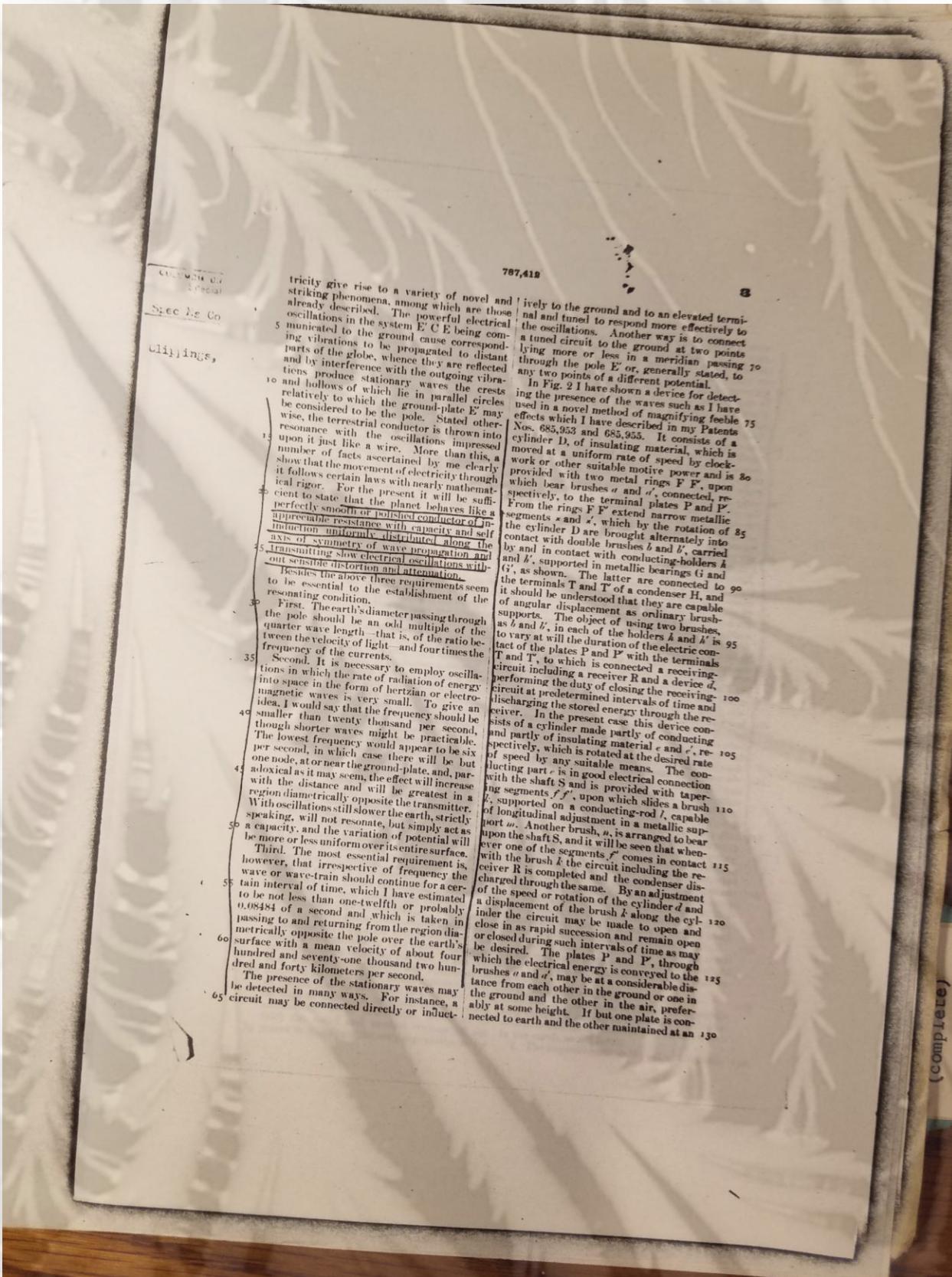
I shall typically illustrate the manner of applying my discovery by describing one of the specific uses of the same—namely, the transmission of intelligible signals or messages between distant points—and with this object reference is now made to the accompanying drawings, in which—

Figure 1 represents diagrammatically the generator which produces stationary waves in the earth, and Fig. 2 an apparatus situated in a remote locality for recording the effects of these waves.

In Fig. 1, A designates a primary coil forming part of a transformer and consisting generally of a few turns of a stout cable of inappreciable resistance, the ends of which are connected to the terminals of a source of powerful electrical oscillations, diagrammatically represented by B. This source is usually a condenser charged to a high potential and discharged in rapid succession through the primary, as in a type of transformer invented

by me and not well known; but when it is desired to produce stationary waves of great lengths an alternating dynamo of suitable construction may be used to energize the primary A. C is a spirally-wound secondary coil within the primary having the end nearer to the latter connected to the ground E' and the other end to an elevated terminal E. The physical constants of coil C, determining its period of vibration, are so chosen and adjusted that the secondary system E' C E is in the closest possible resonance with the oscillations impressed upon it by the primary A. It is, moreover, of the greatest importance in order to still further enhance the rise of pressure and to increase the electrical movement in the secondary system that its resistance be as small as practicable and its self-induction as large as possible under the conditions imposed. The ground should be made with great care, with the object of reducing its resistance. Instead of being directly grounded, as indicated, the coil C may be joined in series or otherwise to the primary A, in which case the latter will be connected to the plate E'; but be it that none or a part or all of the primary or exciting turns are included in the coil C the total length of the conductor from the ground-plate E' to the elevated terminal E should be equal to one-quarter of the wave length of the electrical disturbance in the system E' C E or else equal to that length multiplied by an odd number. This relation being observed, the terminal E will be made to coincide with the points of maximum pressure in the secondary or excited circuit, and the greatest flow of electricity will take place in the same. In order to magnify the electrical movement in the secondary as much as possible, it is essential that its inductive connection with the primary A should not be very intimate, as in ordinary transformers, but loose, so as to permit free oscillation—that is to say, their mutual induction should be small. The spiral form of coil C secures this advantage, while the turns near the primary A are subjected to a strong inductive action and develop a high initial electromotive force. These adjustments and relations being carefully completed and other constructive features indicated rigorously observed, the electrical movement produced in the secondary system by the inductive action of the primary A will be enormously magnified, the increase being directly proportionate to the inductance and frequency and inversely to the resistance of the secondary system. I have found it practicable to produce in this manner an electrical movement thousands of times greater than the initial—that is, the one impressed upon the secondary by the primary A—and I have thus reached activities or rates of flow of electrical energy in the system E' C E measured by many tens of thousands of horsepower. Such immense movements of elec-

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elevation, the location of the apparatus must be determined with reference to the position of the stationary waves established by the generator, the effect evidently being greatest in a maximum and zero in a nodal region. On the other hand, if both plates be connected to earth the points of connection must be selected with reference to the difference of potential which it is desired to secure, the strongest effect being of course obtained when the plates are at a distance equal to half the wave length.

In illustration of the operation of the system let it be assumed that alternating electrical impulses from the generator are caused to produce stationary waves in the earth, as above described, and that the receiving apparatus is properly located with reference to the position of the nodal and ventral regions of the waves. The speed of rotation of the cylinder D is varied until it is made to turn in synchronism with the alternate impulses of the generator, and the position of the brushes b and b' is adjusted by angular displacement or otherwise, so that they are in contact with the segments S and S' during the periods when the impulses are at or near the maximum of their intensity. These requirements being fulfilled, electrical charges of the same sign will be conveyed to each of the terminals of the condenser, and with each fresh impulse it will be charged to a higher potential. The speed of rotation of the cylinder d being adjustable at will, the energy of any number of separate impulses may thus be accumulated in potential form and discharged through the receiver R upon the brush b' coming in contact with one of the segments r'. It will be understood that the capacity of the condenser should be such as to allow the storing of a much greater amount of energy than is required for the ordinary operation of the receiver. Since by this method a relatively great amount of energy and in a suitable form may be made available for the operation of a receiver, the latter need not be very sensitive; but when the impulses are very weak or when it is desired to operate a receiver very rapidly any of the well-known sensitive devices capable of responding to very feeble influences may be used in the manner indicated or in other ways. Under the conditions described it is evident that during the continuance of the stationary waves the receiver will be actuated by current impulses more or less intense, according to its location with reference to the maxima and minima of said waves; but upon interrupting or reducing the flow of the current the stationary waves will disappear or diminish in intensity. Hence a great variety of effects may be produced in a receiver, according to the mode in which the waves are controlled. It is practicable, however, to shift the nodal and ventral regions of the waves at will from the sending-station, as by

varying the length of the waves under observance of the above requirements. In this manner the regions of maximum and minimum effect may be made to coincide with any receiving station or stations. By impressing upon the earth two or more oscillations of different wave length a resultant stationary wave may be made to travel slowly over the globe, and thus a great variety of useful effects may be produced. Evidently the course of a vessel may be easily determined without the use of a compass, as by a circuit connected to the earth at two points, for the effect exerted upon the circuit will be greatest when the plates P P' are lying on a meridian passing through ground-plate E' and will be ⁷⁵ least when the plates are located at a parallel circle. If the nodal and ventral regions are maintained in fixed positions, the speed of a vessel carrying a receiving apparatus may be exactly computed from observations of the maxima and minima regions successively traversed. This will be understood when it is stated that the projections of all the nodes and loops on the earth's diameter passing through the pole or axis of symmetry of the wave movement are all equal. Hence in any region at the surface the wave length can be ascertained from simple rules of geometry. Conversely, knowing the wave length, the distance from the source can be readily calculated. In like ways the distance of one point from another, the latitude and longitude, the hour, &c., may be determined from the observation of such stationary waves. If several such generators of stationary waves, preferable of different length, were installed in judiciously-selected localities, the entire globe could be subdivided in definite zones of electric activity, and such and other important data could be at once obtained by simple calculation or readings from suitably-graduated instruments. Many other useful applications of my discovery will suggest themselves, and in this respect I do not wish to limit myself. Thus the specific plan herein described of producing the stationary waves might be departed from. For example, the circuit which impresses the powerful oscillations upon the earth might be connected to the latter at two points. In this application I have advanced various improvements in means and methods of producing and utilizing electrical effects which either in connection with my present discovery or independently of the same may be usefully applied.

I desire it to be understood that such novel features as are not herein specifically claimed will form the subjects of subsequent applications.

What I now claim is—

1. The improvement in the art of transmitting electrical energy to a distance which consists in establishing stationary electrical waves in the earth, as set forth.
2. The improvement in the art of transmit-

(complete)

U.S. Patent Office

Serial No. 1,111,111

Date filed

787,618

Transmitting electrical energy to a distance which consists in impressing upon the earth electrical oscillations of such character as to produce stationary electrical waves therein, as set forth.

3. The improvement in the art of transmitting and utilizing electrical energy which consists in establishing stationary electrical waves in the natural conducting media, and operating thereby one or more receiving devices remote from the source of energy, as set forth.

4. The improvement in the art of transmitting and utilizing electrical energy which consists in establishing in the natural conducting media, stationary electrical waves of predetermined length and operating thereby one or more receiving devices remote from the source of energy and properly located with respect

to the position of such waves, as herein set forth.

5. The improvement in the art of transmitting and utilizing electrical energy, which consists in establishing in the natural conducting media, stationary electrical waves, and varying the length of such waves, as herein set forth.

6. The improvement in the art of transmitting and utilizing electrical energy, which consists in establishing in the natural conducting media stationary electrical waves and shifting, so the nodal and ventral regions of these waves, as described.

NIKOLA TESLA.

Witnesses:
M. Lawson Dryer,
Benjamin Miller.

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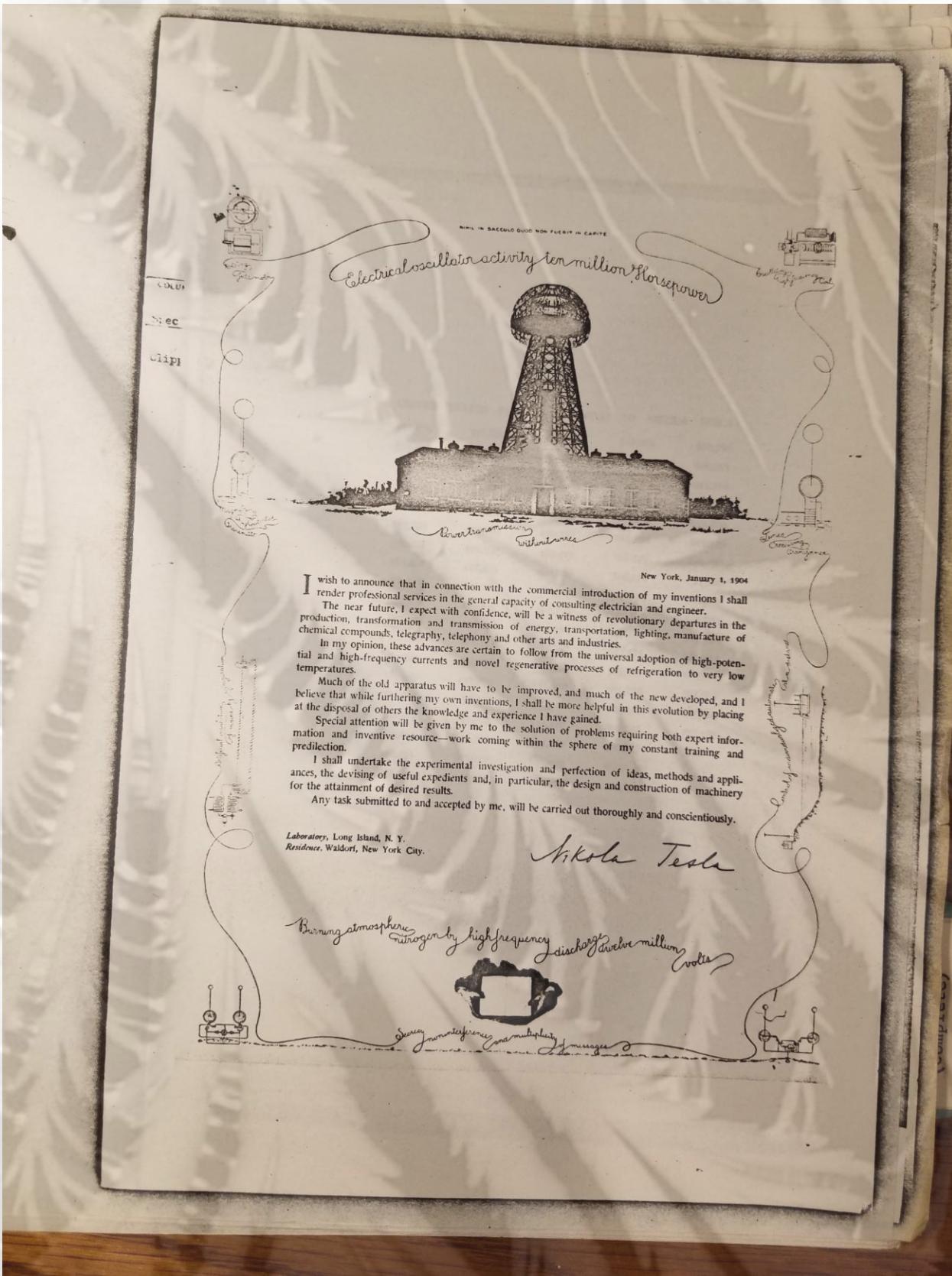
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335,786	396,121	454,622	514,973	609,251
335,787	401,520	455,067	517,900	611,719
336,961	405,858	455,068	524,426	613,735
336,962	405,859	455,069	555,190	613,809
350,704	406,968	459,772	568,176	645,576
359,748	416,192	462,418	568,177	649,621
381,968	416,193	464,666	568,178	11,865
381,969	416,194	464,667	568,179	685,012
381,970	416,195	487,796	568,180	685,953
382,279	417,794	511,559	577,670	685,954
382,280	418,248	511,560	577,671	685,955
382,281	424,036	511,915	583,953	685,956
382,282	433,700	511,916	593,138	685,957
382,845	433,701	512,340	609,245	685,958
390,413	433,702	514,167	609,246	723,188
390,414	433,703	514,168	609,247	725,605
390,415	445,207	514,169	609,248	
390,721	447,921	514,170	609,249	

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"In connection with resonance effects and the transmission of energy over a single conductor, I would say a few words on a subject which constantly fills my thoughts, and which concerns the welfare of all. I mean the transmission of intelligible signals or, perhaps, even power, to any distance without the use of wires. I am becoming daily more convinced of the practicability of the scheme; and though I know full well that the great majority of scientific men will not believe that such results can be practically and immediately realized, yet I think that all consider the developments in recent years by a number of workers to have been such as to encourage thought and experiment in this direction. My conviction has grown so strong that I no longer look upon this plan of energy or intelligence transmission as a mere theoretical possibility, but as a serious problem in electrical engineering, which must be carried out some day. * * * In fact, what is there against the carrying out of such a scheme? We now know that electric vibration may be transmitted through a single conductor. Why, then, not try to avail ourselves of the earth for this purpose? * * * Theoretically, it could not require a great amount of energy to produce a disturbance perceptible at great distance, or even all over the surface of the globe. I think that, beyond doubt, it is possible to operate electrical devices in a city, through the ground or pipe system, by resonance from an electrical oscillator located at a central point. But the practical solution of this problem would be of incomparably smaller benefit to man than the realization of the scheme of transmitting intelligence or, perhaps power, to any distance through the earth or enveloping medium. Proper apparatus must first be produced, by means of which the problem can be attacked, and I have devoted much thought to this subject. I am firmly convinced that it can be done, and hope that we shall live to see it done." — *Light and Other High-frequency Phenomena.**

*Lecture delivered before the Franklin Institute, Philadelphia, February, 1893, and before the National Electric Light Association, St. Louis, March, 1893.

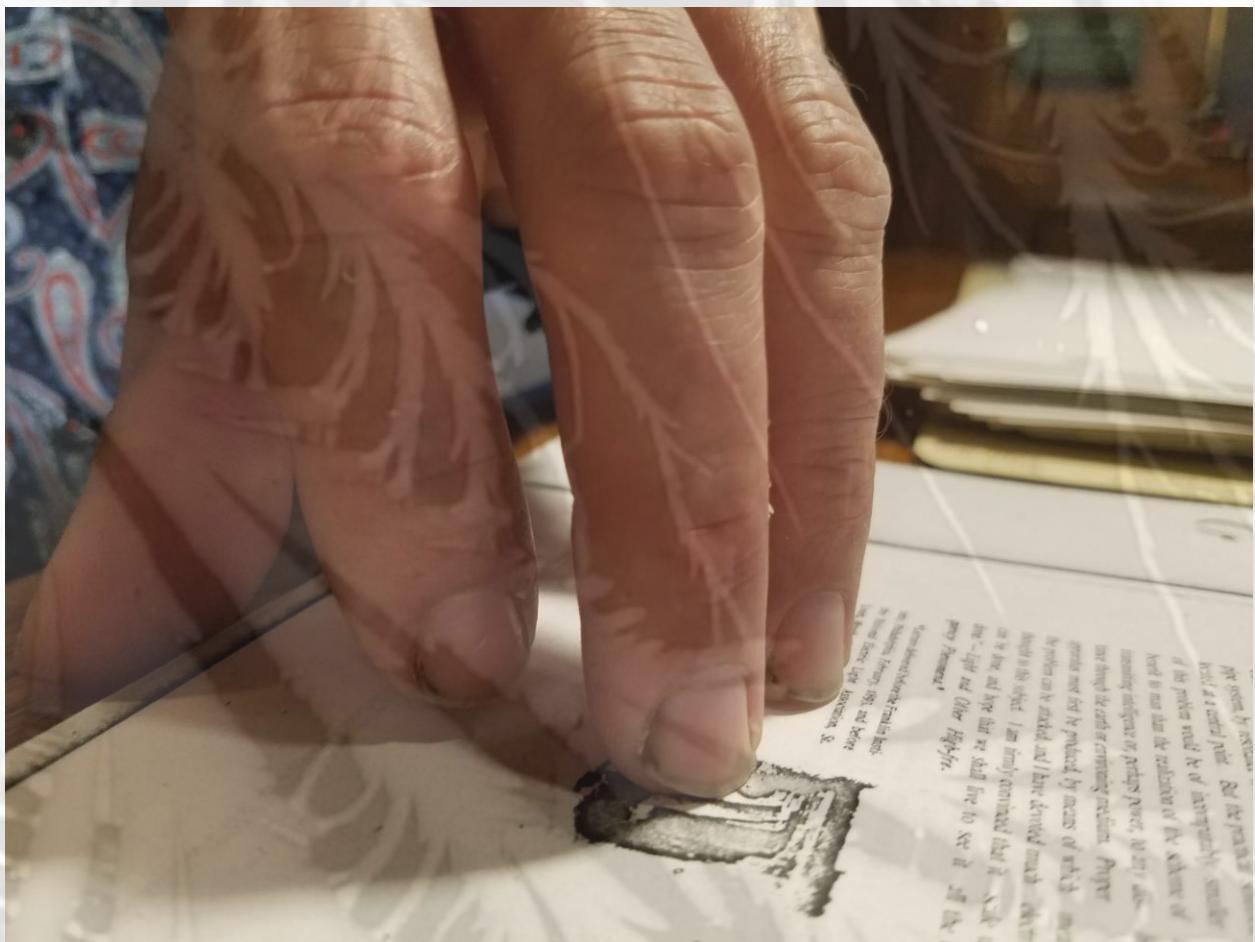
"Electrical effects of any desired character and of intensities undreamed of before are now easily producible by perfected apparatus of this kind * * *. I have produced electrical discharges, the actual path of which, from end to end, was probably more than one hundred feet long; but it would not be difficult to reach lengths one hundred times as great. I have produced electrical movements occurring at the rate of approximately one hundred thousand horse-power, but rates of one, five, or ten million horse-power are easily practicable. In these experimental effects were developed incomparably greater than any ever produced by human agencies, and yet these results are but an embryo of what is to be. That communication without wires to any point of the globe is practicable with such apparatus would need no demonstration, but through a discovery I made I obtained absolute certitude. Popularly explained, it is exactly this: When we raise the voice and hear an echo in reply, we know that the sound of the voice must have reached a distant wall, or boundary, and must have been reflected from the same. Exactly as the sound, so an electrical wave is reflected, and the same evidence which is afforded by an echo is offered by an electrical phenomenon known as a 'stationary' wave—that is, a wave with fixed nodal and ventral regions. Instead of sending sound vibrations toward a distant wall, I have sent electrical vibrations toward the remote boundaries of the earth, and instead of the wall, the earth has replied. In place of an echo I have obtained a stationary electrical wave * * *. — *The Problem of Increasing Human Energy, Century, June, 1900.*

"By the discovery of these facts and perfection of means * * * it becomes possible to transmit * * * electrical energy * * * for industrial uses on a large scale up to practically any amount and, according to all the experimental evidence I have obtained, to any terrestrial distance. * * * The transmitting as well as receiving apparatus may be * * * movable as, when * * * carried by vessels floating in the air or by ships at sea * * *. — U. S. Patents Nos. 645,576 and 649,621.

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many hours, perhaps more, to write
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writing is very
neat and may be printed by means of which
the problem is solved, and I have devoted much
thought to the object. I am firmly convinced that it is
possible to do all this, and hope that we shall live to see it
done. - Let me know when we shall live to see it.
Very sincerely yours,
John Franklin.

John Franklin
to George Murray, 1851, at home
Long Store, 1851, at home
London, &



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1. The Onward Movement of Man. - The Forces and Laws Governing the Movement. - The Energy of the Movement. The Three Ways of Increasing Human Energy.
2. The first Problem: How to Increase the Living Mass. The Burning of Atmospheric Nitrogen. - The Second Problem: How to Reduce the Force Retarding the Living Mass. The Art of Telautomatics. - The Third Problem: How to Increase the Force Accelerating the Living Mass. The Harnessing of the Sun's Energy.
3. Man's first Act of Scientific Philanthropy. The Three Great Possibilities in the Utilization of the Sun's Energy: Burning Coal in a Battery; obtaining Energy from the Natural Medium; transmitting Energy through the Natural Medium.
4. Advances in Electrical Energy Transmission. The Rotating Magnetic Field. Transmission through a Single Wire without Return. Transmission through the Earth Alone. System of "Wireless" Telegraphy.
5. The Wonderful Features of the Electrical Condenser. Perfection of the Electrical Oscillator. Production of Oscillations of Great Power. Practicability of Trans-Oceanic "Wireless" Telegraphy Demonstrated. New Principle Offering Possibility of Interplanetary Communication.
6. Production of Extreme Electrical Pressures. Discovery of Conducting Properties of the Atmosphere. Difficulties Overcome and Results Attained. Electrical Power Transmission to any Distance without Wires the Best Way of Harnessing the Sun's Energy.

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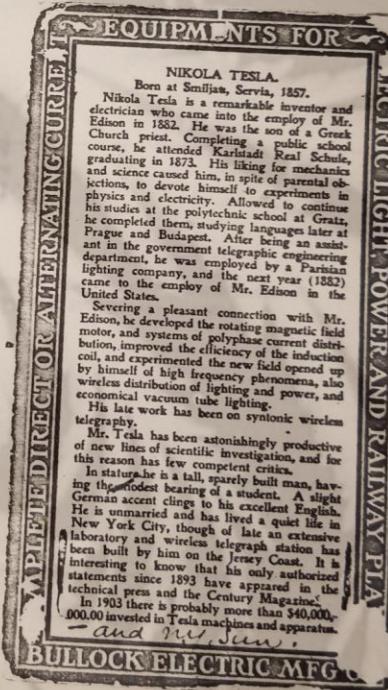
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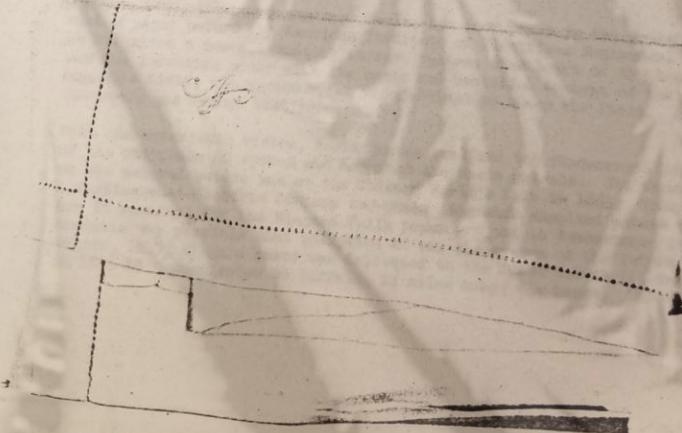
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327



RADIO -
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NEWS RELEASE

Algonquin 5-7755

June 25, 1956

A commemorative ceremony was held at 11 A.M., Monday, June 25th, at the offices of RADIO-ELECTRONICS magazine, at 154 West 14 Street, New York, honoring the 100th anniversary of the birth of the late Nikola Tesla, possibly the greatest inventor who ever lived.

Lazar Lilic, consul general of Yugoslavia in New York, unveiled a memorial head of the great inventor. The Yugoslavian diplomat was invited to officiate at the unveiling because Tesla was a native of Croatia, now a part of Yugoslavia.

Hugo Gernsback, the publisher, a long-time intimate friend of Tesla, arranged the ceremony, and he also commissioned the commemorative sculptured base upon which the head rests.

Tesla--the Father of Wireless--was credited with more than 1,000 inventions, over 900 of which he patented. Unfortunately, he was so far ahead of his contemporaries that his patents often expired before they could be put to practical use. Our whole alternating current power system rests on Tesla's rotating field multiphase alternating-current concepts. He described a wireless system--with elevated antenna at transmitter and receiver--in 1893, one year before Marconi became interested in the study of wireless. Tesla's radio-guided submarine of the 1890s is the ancestor of all guided missiles. His filament-less electric lamps were the forerunners on which our neon and fluorescent lamps of today are based.

In May, 1888, the young engineer Tesla, but four years in the United States, read a paper before the American Institute of Electrical Engineers. In it he described a new alternating current system. The heart of the lecture was the induction motor with its basic and beautiful concept of the rotating magnetic field, the system which was destined to sweep the field. Among the listeners was George Westinghouse.

With characteristic vision, Westinghouse realized the fundamental importance of the polyphase AC system and acquired the basic patents. Its first impact on the general public was at the Chicago World's Fair in 1893. There a Westinghouse Electric Company two-phase generator supplied motors and lamps. But it remained for the Niagara Falls power project to demonstrate in the most dramatic way possible that polyphase AC was the system of the future, for in August, 1895, Niagara power was delivered to the first industrial customer, and in 1896 AC transmission to Buffalo, 22 miles away, was begun. Through the

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combined efforts of Nikola Tesla and George Westinghouse the modern age of electric power had truly opened.

The memorial is the actual death mask which Mr. Gernsback obtained on the day of Tesla's death, January 7, 1943. He conceived the idea of having the original plaster of Paris death mask heavily copper plated, a delicate undertaking never carried out before on a death mask. It required a ten-day electroplating process so the memorial could be permanently preserved for posterity.

The outstanding sculptor, Onorio Ruotolo, executed the novel base upon which the head is mounted. The three medallions on the base depict Tesla's outstanding inventions: the induction motor, first to use alternating current; the famed Tesla coil, which gave us high frequency currents; the Tesla wireless tower, first to transmit power by wireless through space.

Over 50 persons, all old-timers who knew Tesla personally, attended the unveiling exercises. There were many notables among the invited guests.

* * * * *

SEE ALSO RADIO-ELECTRONICS JULY 1956, Pages 6 and 29.

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AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS
33 WEST THIRTY-NINTH STREET
NEW YORK 18, N.Y.



TELEPHONE PENNSYLVANIA 6-9220
CABLE, CYANORIC

April 15, 1954

Mrs. Agnes Johnson Holden
327 East 52nd Street
New York 22, New York

Dear Mrs. Holden:

We do not know of any memorial or museum to
Nikola Tesla.

If you are interested in publications regarding
his work, I suggest a visit to the Engineering Society Library
on the 13th floor of this building.

Very truly yours,

H. H. Henline

Secretary

HHH:bk

Cc - Mr. Elgin B. Robertson

(complete)

TESLA AND THE FUTURE

In Oct., '42 Nikola Tesla wrote in his Preface to a Yugoslav edition of Vice-President Henry A. Wallace's address on *The Future of the Common Man*:

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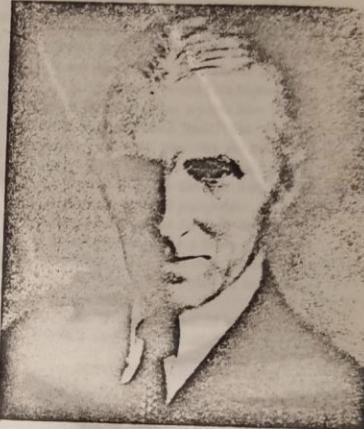
Out of this war, the greatest since the beginning of history, a new world must be born, a world that would justify the sacrifices offered by humanity. This new world must be a world in which there shall be no exploitation of the weak by the strong, of the good by the evil; where there will be no humiliation of the poor by the violence of the rich; where the products of intellect, science and art will serve society for the betterment and beautification of life, and not the individuals for achieving wealth. This new world shall not be a world of the down-trodden and humiliated, but of free men and free nations, equal in dignity and respect for man.



KOSTICH PHOTOS, ASTORIA, N. Y.

SS NIKOLA TESLA, a 10,000-ton Liberty ship, was launched at the Bethlehem-Fairfield Shipyards near Baltimore on Sept. 25th. The sponsor was Mrs. Vlasta Subashich. The men grouped around her in the above picture are, left to right: Ethan Kristan, president of the Slovenian American Council; Stoyan Gavrilovich, Banus Ivan Subashich of Croatia, Bogdan Radlits and Louis Adamic; Zlatko Balokovic, president of the Council of Americans of Croatian Descent; and Sava Kosanovich and Nikola Trbojevich, nephews of the late Nikola Tesla. Others present at the launching were: Jorij Pettinovic, of Dalmatia and Chile, now visiting in the United States; Capt. Ivo Antunovich and Thomas Babin, representing Yugoslav seamen; Mrs. Anna Furlan and Misses Charlotte Muzar, Anne Traven and Mary Kraljich.

• 3 •



THE LATE NIKOLA TESLA of whom the well-known scientific writer Behrend wrote some years ago: "Were we to eliminate from our industrial world the results of Tesla's work, the wheels of industry would cease to turn, our electric trains and cars would stop, our towns would be dark, our mines and factories dead and idle. So far-reaching is his work that it has become the warp and woof of industry. Should Tesla's work be suddenly withdrawn, darkness would prevail and we would slip into barbarism."

Tesla was a Serbian born in the region known as Lika, in Croatia. His contributions to the American and world civilization were so great that they cannot be computed even in the present-day astronomical figures in which material wealth is expressed. Last January he died in extreme poverty in a New York hotel.



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A CHILDISH TALE IN A TRAGIC BACKGROUND

Under this title, the New York Post of Oct. 1st published the following review by Sam Halper of Ruth Mitchell's strange book The Serbs Choose War:

The moment the German bombers attacked Belgrade Ruth Mitchell buckled on her Chetnik dagger and began to pack her antiques. She was determined not to let the beastly Nazis get their hands on her precious drapes, vases and old woods. To be sure that the Nazis would never find out where they were, she had the two Nazi spies, especially assigned to her by the Gestapo (so she says), dump them in a hiding place. And if you're confused about that, let me warn you this is just the beginning of Miss Mitchell's story.

In the four years she spent in the Balkans Miss Mitchell was offered the post of Albania's Minister of Culture (she couldn't speak the language); was the subject of fierce debates as to whether or not she was a spy; and if so, for whom; was leered at amorously by all kinds of men who made delicately indecent proposals (all carefully recorded); and even drew up a plan for the complete reorganization of Albania, the fate of which is unclear since the Italians almost simultaneously ousted King Zog.

In addition she became a full-fledged member of the Serbian skull-and-skin-bones organization, the Chetniks, and was given a uniform into whose lapel was sewn a packet of poison to be swallowed in the event of capture by the enemy. At that time, the authoress noted with fervor, "I was a Chetnik—until death."

Not quite. For when she was captured and the moment came to die, she decided she would hide instead. Her "hiding place" was to be her American passport. She expected the Germans to release her from captivity, following which she would spy on them and send the information to Mikhailevitch. What Miss Mitchell does not explain is how she expected to hide from the Germans by using a passport which identified her so clearly.

Overlooking these details, the fact remains that when the Germans nabbed her, she was jailed for 13 months. It was then that Miss Mitchell claims the Nazis put out a report that she was dead. That set

her to thinking. "Why? Did they think it would have a lowering effect on the morale of the Fighting Serbs?" Miss Mitchell decided not. In fact, she felt that the news of her martyrdom would inspire Mikhailevitch to even greater heights.

Thus does Miss Mitchell spin out her childish story against a background of real tragedy. So she runs all the way—from near-amorous encounters (she is a lady of some years; her father was a soldier in the Civil War), to signs from heaven, to spy plots, to singing the Chetnik hymn in the prison lavatory.

If Sigmund Freud were alive, I should like to see what he would say about Miss Mitchell's story.

GOING CONCERN

Under this heading, the San Francisco Chronicle of Sept. 18th published the ensuing editorial:

Yugoslavia's guerrilla armies are now issuing communiqués. A Free Yugoslavia radio station is sending direct dispatches to New York.

These are interesting indications of how successfully a beleaguered people, surrounded by Axis forces, can wage a fight for freedom. . . . They have captured many towns and seaports and taken control of railways. A report from Cairo says that soldiers from the Italian Bergamo division, now mustered into a "Garibaldi division," are fighting side by side with Yugoslavia against the Germans.

The revolutionary state set up by the guerrilla armies seems definitely to be a going concern. It must worry King Peter almost as much as it does Hitler. . . .

In a later editorial, the same paper said:
From all accounts the Yugoslav guerrillas are making things mighty tough for the Germans on the Dalmatian coast and

in the northeastern corner of Italy itself. The Partisans were said yesterday to hold firmly the whole Istrian peninsula in Italy, presumably including the Italian naval base of Pola. This account said there is heavy fighting on the Pola highway outside Trieste. Other reports have told of fighting in Trieste itself. On the Dalmatian coast the guerrillas are still standing off the Germans at Split and Susak.

Undoubtedly the German lines in this region are stretched pretty thin. The garrison work that was formerly done by the Italians suddenly put a heavy burden on the Nazis. More than that, Italian troops by the thousands are said to be joining the guerrillas.

What a time this would be to put an Allied army into Dalmatia!

BULGARIA WITHOUT BORIS

Editorial in the New Yorker Staatszeitung und Herold, a German-language daily:

Bulgaria without Boris faces a decisive turning point. Perhaps history will repeat itself. . . . The downfall of the Central Powers began with Bulgaria in the first World War. Bulgaria might also ring in the funeral of the Third Reich.

The throne of King Boris was supported . . . solely by German bayonets. But even these bayonets failed to drive the Bulgarians to fight against Russia. No one knew better than Boris that the Bulgarian peasant would under no circumstances go into action against his Russian friend and brother.

• 6 •

One of the forthcoming issues of the BULLETIN will bring "The Predicament of Small Nations" by James Marshall, lawyer, author and civic leader, former president of the New York City's Board of Education.

The United Committee is a non-profit organization whose operational funds will come from donations of organizations and persons agreeing with its purposes, basic ideas and functions. Please make checks payable to "The United Committee of South-Slavic Americans."

All communications should be addressed to: The United Committee of South-Slavic Americans, 1010 Park Avenue, New York 28, N. Y.

IMPERIALIST ITALY AND HER WAYS

On Sept. 2d the New York Sun published an editorial entitled "Italy's Crowning Disaster," which read in part:

Italy's surrender to the Allies marks but the close of another chapter in the strange and complicated tale of historic opportunism by which that country became able to take a place among the Powers of modern Europe. When its leadership has guessed right about the quarrels of neighbors, Italy has prospered; when it has guessed wrong it has gone into decline. That its leaders have had high and noble aspirations nobody can deny; that at times they have been willing to chaffer for glory as a huckster in New York chaffers for fruits and groceries is equally undeniable. In their defense it can be said, however, that perhaps by no other course could they have hoped to make headway against the strong, rival Powers which hedged them about. And if they were willing to exploit the feuds of other nations they did not hesitate to take the risks of battle.

On the part of European politics it could be said that Cavour made no bad bargain when, in 1859, he was willing to give Savoy and perhaps Nice in exchange for French assistance against Austria. That it did not turn out any too well was no fault of Cavour's although its partial success was not enough to keep him from quitting office for the time being. Ultimately, as one of the fruits of the Austro-Prussian war of 1866, Venetia was joyfully gathered in as among the spoils of war. The downfall of Napoleon III in the Franco-Prussian war of 1870 freed Italy of all obligations allegedly owed to the Emperor of the French and played no small part in the later unification of the country under the crown of Victor Emanuel II. But it was still necessary for Italy to make an arrangement for security as against its ancient enemy, Austria, and this undoubtedly did much to lure it into Bismarck's Triple Alliance affecting Germany, Austria and Italy.

All the details of the Triple Alliance have not been made available to the general public, but the Austrian government in 1915 gave out enough of it to serve as

a basis for Austria's contention that by going over to the Allies Italy would violate the most solemn of pledges. The three Powers, it was said, had promised to one another a course of reciprocal friendship and peace; had agreed to exchange views on political and economic questions; and to support one another within the limits of their particular interests; had agreed upon reciprocal assistance, backed by full military strength, whenever attacked without direct challenge by two or more great Powers. Austria-Hungary and Germany, it was declared, had made an especial pledge to assist Italy with their full military strength in the event Italy should be attacked by France. These arrangements were no doubt modified from time to time in various respects. It has been said on behalf of Italy that in 1896 that country notified the Central Powers that it could not participate in a war in which Britain and France should figure as joint adversaries of the nations included in the Dreieck.

However that may have been, when World War I came Britain and France were willing to bid high for Italy's support. The secret Treaty of London—against stipulation of which Woodrow Wilson afterward so vigorously protested—was followed by Italy's entrance into the war, not on the side of the Dreieck but on that of the Allies. Some Italians have charged with great bitterness that when the time for settlement came Italy was defrauded out of much that had been promised. It is nevertheless undeniable

that Italy did in fact get much of what it wanted [including vast Yugoslav territories], and that it emerged from that struggle as one of the great Powers of the Continent.

But under the leadership of Mussolini Italy demanded more, much more. In defiance of its obligations under the Covenant of the League of Nations and the Briand-Kellogg compact, it conquered Ethiopia. Then it wanted to become supreme in North Africa, covering Tunisia also, and, as if that were not enough, bawling in the streets demands for Sicily, Savoy and Corsica. Opportunism's great chance seemed to come in the summer of 1940 when France was staggering to defeat and Britain seemed doomed to disaster. So, on June 10, Italy declared war and started out to collect dividends upon its treachery. After Dunkirk Mussolini even sent bombers over to help his friend, Hitler, win the Battle of Britain. Two days before Christmas of that year Winston Churchill said to the Italians:

Your aviators have tried to cast their bombs upon London. Our armies are tearing—and will tear—your African empire to shreds and tatters. We are now only at the beginning of this somber tale. Who can say where it will end? Presently we shall be forced to come to closer grips.

The first part of this promise was kept in the spring of this year when the Axis was driven out of Tunisia. Another installment has been collected with the signing of the new armistice. Three years ago Italy was not only a nation; it boasted of itself as an empire. Today it bows in acknowledgment of utter defeat. Of all the markets to which it has ever taken its

PORTRAIT OF TITO BY HUGO GELLERT

Hugo Gellert, one of the outstanding American artists whose work is on the walls of the leading art museums, is doing a striking portrait of Tito, commander-in-chief of the Yugoslav Liberation Armies. More than a portrait, the picture—in four colors—will be a representation of the whole amazing Yugoslav struggle during 1941-'43.

Several thousand reproductions of the picture—10 inches by 8, ready for framing—will be available at \$1 a copy; 6 for \$5; 25 for \$20; 100 for \$60. The profit will be used to help cover the expenses of the United Committee. Send orders with remittance to:

The United Committee of South-Slavic Americans, 1010 Park Avenue, New York 28, N. Y.

goods, the one it entered on June 10, 1940, has proved incomparably the worst.

The above editorial evoked much comment. A good deal of it was unfavorable to the Sun. Some of it came from important Americans and Britons who are so afraid of Russia that they fear and hate all Slavs, including the Balkan Slavs, although a preponderance of them are fighting on the side of Britain and the United States while Italy fought with Hitler. People of this sort want Italy to retain her grab after World War I in order to keep the Slavs in southeastern Europe as weak as possible. It is this attitude that Sforza & Co. exploit in their propaganda.

The Italian-language press greatly resented the editorial.

On October 5th the Sun published another comment "The Record of Italy," which read:

Loyal Americans of Italian extraction are naturally sensitive to criticism of Italian policy since the beginning of the war. The feeling is quite strong among them that since the present Italian government has come out on the side of the Allies we should all let bygones be bygones and not call up unhappy memories. To this the rest of us can but reply that we are quite ready to welcome Italy once more to our friendship, but that, although Italy was our friend in the peace of the past, and no doubt will be our friend in the peace to come, it was our enemy in war; that we have every right to tell the truth, as we see it, about the mad course that made a bitter and vindictive foe out of a nation which we have had many causes to love. Nor do we believe that any lasting good can be obtained by ignoring facts or misrepresenting history. The Sun, for example, has been accused of distorting history in an editorial article of September 9 referring to Italy's abandonment of the Triple Alliance in 1915. One publication has this to say:

The determining factor in Italy's repudiation of the Triple Alliance was the fact that Austria attacked weak little Serbia and Montenegro without notifying its Italian ally. The British situation had nothing to do with it. Italy had a particular interest in having friends on the other side of the Adriatic, and she thought she had a friend in Serbia as she knew she had one in Montenegro. . . . Britain and France

were willing to bid high for Italy's support, but would any one have had Italy refuse that support?

The obvious purpose here is to challenge an implication in our article that in 1915 the government of Italy hawked its wares around in every available market. As first of many witnesses competent to testify on this subject we may call to the stand Dr. George Peabody Gooch of Trinity College, Cambridge University, England, whose "History and Historians in the Nineteenth Century" is generally looked upon by scholars as a masterpiece in its field. In his "History of Modern Europe, 1878-1919," Dr. Gooch dealt somewhat extensively with the negotiations which foreshadowed Italy's intervention in the last war.

In the early days of the war, says Dr. Gooch (page 572 in the work to which we have just made reference), the Italian government asked its partners [Germany and Austria] for compensation under Article 7 of the Triple Alliance and hinted a wish through Berlin for the Trentino. This was dismissed by Vienna, but the death of San Giuliano brought to the helm of Italian foreign affairs Sonnino, who had been one of the stoutest champions of the Triple Alliance. On entering the Salandra Ministry, Sonnino accepted the principle enunciated by his chief, that what was needed was freedom "from all preconceptions and prejudices, from every sentiment except that of sacred egoism." He at once renewed the suggestion about the Trentino. Berlin supported him, but Berchtold still said no. Whereupon Berlin again urged Vienna to concessions but the stubborn Berchtold again refused.

At that moment the Austrian Foreign Minister was dismissed and Burian was summoned to take his place. On March 9 Burian was alarmed by the Russian advance in Galicia and feared it might bring Rumania in on the side of the Allies. Accordingly he announced that he was ready to talk territory with Italy, but by that time Sonnino had raised his price. On April 10 the Italian Minister demanded the whole of South Tyrol, Gorizia, Gradiška and Trieste, together with several islands off the Dalmatian coast and Italian sovereignty over Valona. The Austrians

again balked, but Italy knew where there was a market ready to listen to reason. Accordingly, on April 28, the secret Treaty of London was signed by Sir Edward Grey and the Ambassadors of Russia, France and Italy. Dr. Gooch records under the sub-title, "The Price Paid," details of the foregoing account of the proceedings.

We make this statement at such length not with any desire to wound anybody's feelings but because we want regular readers of *The Sun* to be reminded that when we discuss such matters we always endeavor to get detailed, authentic and plausible information.

LIPPmann ON THE BALKANS

Every reader of this BULLETIN should read with care pages 146-152 of Walter Lippmann's best-selling book *U. S. Foreign Policy*, where he speculates about the future of the Balkans and the rest of Eastern Europe.

"The region," he writes, "lies beyond the reach of American power. . . . It is not possible for the United States, and therefore it will not be possible for Great Britain either, to impose and maintain a settlement in this region by military force. Our power is on the sea and in the air, not on the land, and our interest in the interior of the European continent is indirect. . . . The barrier between Russia and the rest of Europe . . . cannot be reconstructed because Russia, emerging from this war the great military power of Europe, whereas in 1918 she was prostrate. . . . Does this mean that Poland, the Danubian states and the Balkan states have no prospect of assured independence and that they are destined inexorably to become satellites of Russia or to be incorporated into the Soviet Union? The question cannot be answered categorically at this time. . . . When the war ends, the Russians will almost certainly have an overwhelming preponderance of military force in this region, and it is inconceivable that the Red Army, after liberating these people from the Nazi conquerors, will permit governments operating from London or Washington to organize anti-Russian states on the Russian border."

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The Gold Medal of the National Inst. of Arts & Letters.
To be awarded in succession to work of especially
merit in various branches of literature and the arts.
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DR W. C. WARD,
PHOTOGRAPHER,
10 EAST 17TH STREET,
NEW YORK.

Awarded, for the first time, to the work of Saint-Judah
published to Mrs. St. John's Nov. 2nd, 1909.

Presented to R. H. Johnson, Counter Magazine.

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THE UNVEILING OF THE

NIKOLA TESLA MEMORIAL

IN COMMEMORATION OF HIS 100TH BIRTHDAY

THE DATE: JUNE 25, 1956

THE TIME: 11 O'CLOCK IN THE MORNING

THE LOCATION: 154 WEST 14TH STREET, N.Y.

REFRESHMENTS WILL BE SERVED

R.S.V.P.

RADIO-ELECTRONICS
HUGO GERNBSACK, PUBLISHER

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Translation:

The jury for the competition for a story and scenario for a biographical film on the life of Nikola TESLA gave prizes to only seven of the forty-nine submitted, but none were awarded the first, second or third prizes, since it was felt none of the works answered the specific conditions of the competition.

Two XXVII prizes of 15,000 and 10,000 dinars were awarded for film scenarios. The author of the first has not yet claimed his award, the author of the second is Dragoslav NEDELJKOVIC from Pozarevac.

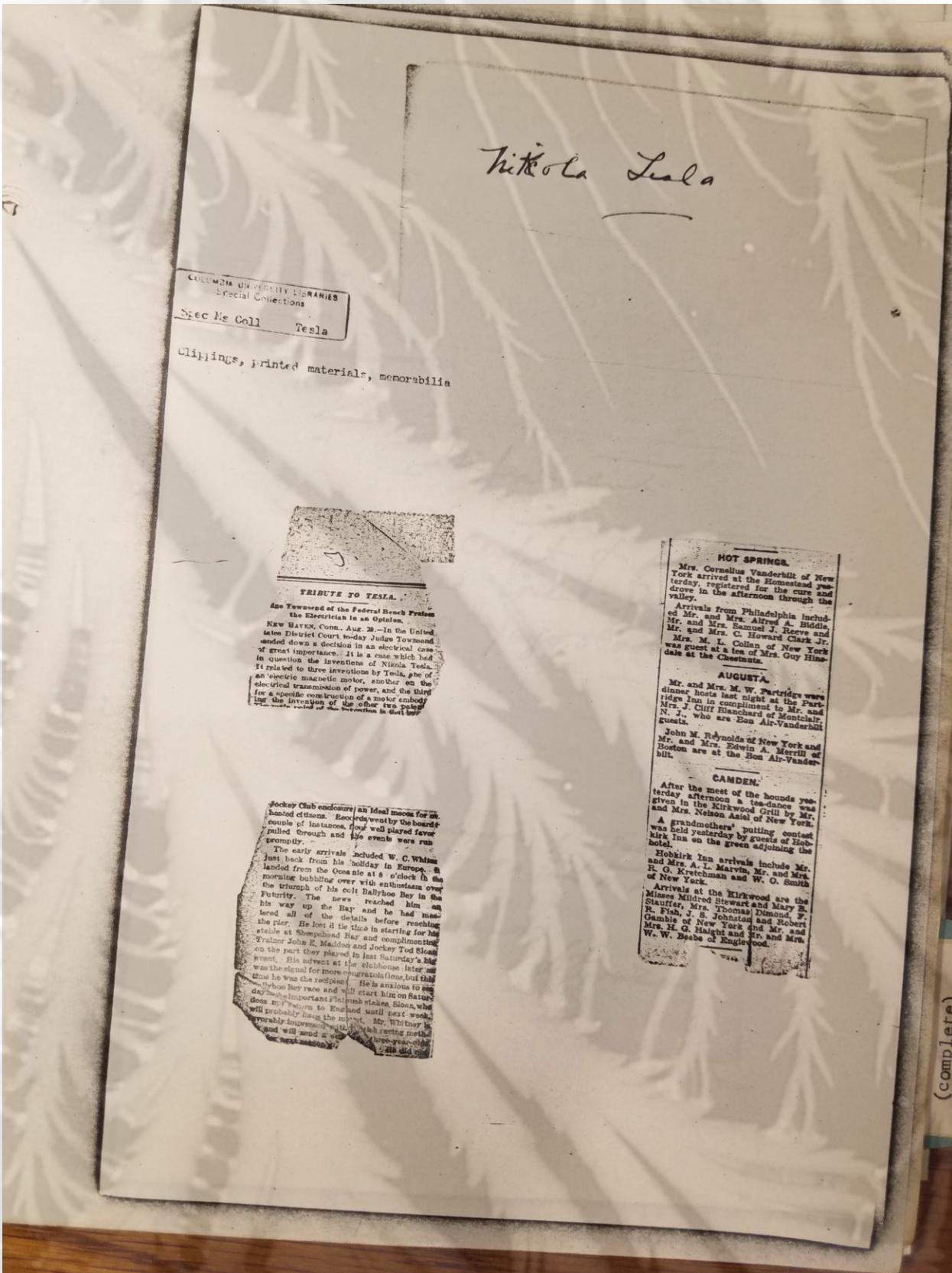
Fourth and fifth awards in the story contest, totalling 300,000 dinars, went to Borislav KEJER of Belgrade and Zvonko VELJACIC of Zagreb.

Three runner-up prizes were awarded in the story contest to Vladimir CARINA and Bozidar BLAGOJEVIC of Belgrade, both 75,000 dinars each, and to Petar TOBANOVIC XXIX of Trstenik, 50,000 dinars.

Rezultati natječaja za
scenario filma o
Nikoli Tesli

Ziri natječaja za scenario i
snop's umjetničko-hograf-
skog filma o Nikoli Tesli, od
49 predloženih radova, nagra-
dio je samo 7 i to nijedan pr-
vom, drugom i trećom nagra-
dom, jer nisu odgovarali uslovi-
mu natječaja.

Za snop's su podjeljene samo
dvije utjecane nagrade, jedna
od 15.000 i druga od 10.000
dinara. Autor prve se još nije
javio, dok je drugu dobiti Dra-
goslav Nedeljković iz Požarev-
ca. Za scenario su dodijeljena
takvira i peta nagrada ukup-
nom iznosu od 300.000 dinara,
a djele ih Borislav Kejer
iz Beograda i Zvonko Veljacić iz
Zagreba. Ziri je dodijelio i tri
najgrade za scenario
Vladimira Carina, Božidara
Blažojevića i Petru Čučme-
viću iz Trstenika 50.000 dinara.



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Clippings, printed materials, memorabilia

Important
Receipt for photoplates
loaned Consul General
of Yugoslavia

"11 Holographs of A. Tesla and
1 letter of his friend
Johnson

July 26 - 1913

S. Jovanovic

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Kenneth M. Swezey, 163 Milton Street, Brooklyn 22, N.Y.

Clippings

Nikola Tesla at Columbia

Tesla-Johnson correspondence revives
a famous association

Kenneth M. Swezey

In acquiring, last December, a collection of letters from the famous scientist-inventor Nikola Tesla to Robert Underwood Johnson, poet and editor of The Century Magazine, the Special Collections Department revived a unique association of Tesla with Columbia University. It also made available to the researcher a correspondence that reveals the warmth, wit, loyalty in friendship, and wide-ranging interests of this enigmatic genius better than any other known. The collection was obtained from Mrs. Agnes Holden, daughter of Dr. Johnson, with funds from the Friends of the Columbia Libraries, and part of it formed the nucleus of the exhibition of Tesla memorabilia held recently in the Butler Library.

To better understand the strange blend of poetry and science, fervor and intellect, in Tesla's character, as shown in his work and particularly in these letters, it may help to consider his extraordinarily cosmopolitan background. Born in 1856 in Smiljan, Croatia (then ruled by Austria-Hungary, but now part of Yugoslavia), of Serbian

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Albion, N.Y.

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Parents, he received his technical education in Graz, Styria, and Prague, Bohemia. His first jobs were with the new telephone company in Budapest and then with the Continental Edison Company in Paris. Coming to America in 1884, he worked for nearly a year at the Edison Machine Works, in New York City. Soon after, establishing there a laboratory of his own, and becoming an American citizen, he began the meteoric career of discovery and invention that was, within a few decades, to change the life and history of the whole world.

Greatest of these discovery-inventions was his induction motor and its associated polyphase system for the generation, transmission, and utilization of electric current, on which he was granted basic patents in 1888, and which later became the foundation of the vast light and power industry we know today. It was Tesla's lecture-demonstration, "Experiments With Alternate Currents of Very High Frequency and Their Application to Methods of Illumination," given at Columbia College on May 20, 1891, however, that started him on the road to popular fame.

At this lecture---presented before the American Institute of Electrical Engineers, at the invitation of Professors Michael Pupin and Francis Crocker---Tesla first demonstrated his high-frequency, high-voltage transformer, soon to become world-famous as the "Tesla coil," and his filamentless tubular gas-filled lights (some bent to form names and others coated with phosphors) that presaged the neon and fluorescent lights of today. In one demonstration he lit lamps, held in his hands "like flaming swords," by several hundreds of thousands of volts passing through his own body! Provided the frequency were high enough, alternating current of enormous voltage could be completely harmless---a discovery in physiology that led to diathermy and other forms of high-frequency electrotherapeutics.

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In attendance were some of the leading electrical men of the country, and others who were subsequently to distinguish themselves. Among the latter was Gano Dunn—then a 20-year-old student of electrical engineering—who acted as Tesla's assistant. Later to become president of the J. G. White Engineering Corporation, trustees of Barnard College, and president of Cooper Union, Dunn wrote to Tesla in 1931: "My contact [on that occasion] left an indelible impression and an inspiration which has influenced my life."

The lecture created such a stir in scientific circles that Tesla was urged to repeat and amplify it the next year before the Institution of Electrical Engineers and the Royal Institution in London, and then the Société Internationale des Électriciens and the Société Française de Physique in Paris. In 1893 he was pressed into giving it again before the Franklin Institute in Philadelphia and the National Electric Light Association in St. Louis.

As a result of this acclaim, Tesla was invited once more to Columbia College, in June 1896, to receive an honorary degree of Doctor of Laws. In recommending the award, Professor Henry Fairfield Osborn had written to President Seth Low: "...there seems to be little doubt that Mr. Tesla is the leading Electrician. ...Poulton (Professor of Biology at Oxford) tells us that Tesla was covered with honors while in England and France. We certainly must not allow any other University to anticipate us in honoring a man who lives under our very walls."

The friendship between Tesla and R. J. Johnson had already been sparked by the same acclaim. The men first met when Thomas Comerford Martin, editor of *The Electrical Engineer*, brought Tesla to the Johnson home on Lexington Avenue, late in 1893. { Martin had just finished his book, *The Inventions, Researches and Writings of Nikola Tesla*, and was preparing an article about Tesla for the Century Magazine.

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Appearing at precisely the right time, this article and this friendship lent a hand in helping Tesla win the degree. Having read the article, Professor Osborn wrote to Dr. Johnson for his personal opinion of Tesla. On May 17, 1894, Johnson wrote a reply (now in ~~Swezey~~ Columbia's "Honors" file). He was "deeply impressed" with Tesla's "scientific and scholarly" temperament. Regarding Tesla's general culture: "...he knows the language and is widely read in the best literature of Italy, Germany and France as well as much of the Slavic countries to say nothing of Greek and Latin. He is particularly fond of poetry and is always quoting Leopardi or Dante or Goethe or the Hungarians or the Russians." Tesla's character was one of "distinguished sweetness, sincerity, modesty, refinement, generosity and force, as you yourself have seen enough of him to know."

The letters in the Tesla-Johnson collection (which also includes a few photographs, magazine articles, and newspaper clippings) give Tesla's side of the story. They number about 165, and date from early 1894 to 1937, the year in which Dr. Johnson died. Some are addressed to Mrs. Johnson, for whom Tesla also had a great affection and admiration; and several, including one in French, to Miss Agnes.

Written on stationery of either "The Gerlach---Strictly Fire Proof Family Hotel," 49 West 27th Street, or his laboratory, 35 South Fifth Avenue, the earliest letters were respectfully formal, beginning "Dear Johnson," or "My dear Mr. Johnson," and signed always, "N. Tesla"---his customary signature. Most were delivered by messenger, rather than by post.

An interchange of interests between Tesla and Johnson (and often Mrs. Johnson) is suggested from the beginning. On January 8, 1894 he asked his friend to thank Mrs. Johnson for the flowers she had sent him the day before (Orthodox Christmas). In appreciation he sent her an

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article by Professor Crookes^{and a Crookes'}, "Radiometer" (a little heat-powered "windmill" that spins in an evacuated bulb), which he considered "the most beautiful invention made."

By April, Tesla had Johnson, along with such fellow-celebrities as Joseph Jefferson, Mark Twain, and Marion Crawford visit his laboratory to take high-voltage sparks through their bodies or to pose for the first photographs ever taken by gaseous-tube light. At the same time, he was making literal translations from works of the Serbian poet, Zmaj Iovan Iovanovich, which Johnson would paraphrase in English verse.

A year later, Tesla wrote boldly, "My Dear---Mr. Johnson, Luka! friend! brother! Answered them all! All! ...if it were not for the typewriter I would have never done it ...and it seems sad to make so many friends by having a misfortune and then to lose them all by replying in type!" Two weeks earlier, Tesla's laboratory had been destroyed by fire. Thereafter he broke with formality, called Johnson "Luka", Mrs. Johnson "Mrs. Filipov", and often even signed his letters "Nikola." The nicknames came from "Luka Filipov," Montenegrin hero Johnson had helped him translate into English.

When Tesla referred in these letters to "millionaires", he was continuing a private joke between himself and the Johnsons, who tried to keep him supplied with wealthy friends in the hope they might finance his inventions. In March, 1899, because of one who did, he moved from the Gerlach to the old Waldorf-Astoria.

Tesla's hypersensitivity to the distress of others is evident in a letter concerning an illness of Kipling: "I cannot tell you how anxious I am. ...I have worked myself into a pitch of excitement and have not slept two nights, being unable to get him off my mind."

Matters discussed in the correspondence include personal and social

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affairs, wireless telegraphy, Tesla's radio-controlled boat of 1898 (forerunner of the guided missile), transmission of power without wires, One series of letters concerns Tesla's long article, "The Problem of Increasing Human Energy," which appeared in the June, 1900 issue of The Century Magazine.

Letters came farther apart as the men grew older, but Tesla's affection never wavered. His last message was a telegram: YOU ARE ALWAYS IN MY THOUGHTS LOKA MY DEAR FRIEND. MAY THE LORD PRESERVE YOU AND IN THE NEW YEAR BESTOW UPON YOU HIS MOST DESIRED BLESSINGS - YOUR NIKOLA.

(Complete)

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Clippings, printed mat

NIKOLA TESLA

On last Thursday night here in our city of New York, a man who was 87 years of age died in his humble hotel room.

His name was Nikola Tesla.

He died in poverty, but he was one of the most successful men who ever lived.

His achievements were great and are becoming greater as time goes on. Nikola Tesla could have amassed hundreds of millions of dollars, could have become the richest man in the country, in the world, if he wished for riches.

He did not.

He did not care for anything, did not have time for anything, that spells success for too many people.

Nikola Tesla was a great humanitarian, a pure scientific genius, a poet in science,

He did extraordinary, amazing, miraculous things during his life amongst us. He did simply to serve mankind, and for his services he did not charge anything.

Money—he did not care for it.

Honor—who was anybody to honor anybody else? That was his attitude.

Gratitude—he did not expect or demand it.

Nikola Tesla did not care to be paid for anything he did for the human race. He simply functioned according to his natural genius, which had come to him in the land of his birth, Yugoslavia, as a son of his mother.

Now this extraordinary man is dead. Or so they say. The papers on Friday told us he died. His body was found still on the bed in his hotel room in this city. And the newspapers published obituaries and editorials summarizing his life and work, and they told of his personal habits and eccentricities.

Tesla, they say, is dead. In a funeral parlor in this city there is all that is left of his person.

The funeral services will be held on next Tuesday afternoon at four o'clock in the Cathedral of St. John the Divine. People will come, many people, people of all walks of life—humble, unknown people and people who are famous—scientists and industrialists, and others.

And that will be all right; it is the customary thing to do. But Tesla is not dead—Tesla is not really dead. Only his poor, wasted body has been stilled.

The real, important part of Tesla lives in his achievement, which is great, almost beyond calculation, and an integral part of our civilization, our daily lives, our current war effort.

Today we on this program do not mourn Tesla, do not honor him, for we know that Nikola Tesla would not care for that.

Why mourn Tesla?

His life is a triumph.

We, who are in this studio today are just thinking of him, talking of him among ourselves and to you who are listening to us, and we are playing some music and singing a few songs which we think Nikola Tesla would have liked.

We celebrate his achievement on earth, his great triumph, which is our triumph—the triumph of all peoples on the earth.

We celebrate his contributions to our life, to the sum-total of civilization and human potentialities in America and everywhere, which will be as permanent as man himself.

We are talking about Tesla, celebrating the fact that we belong to the same species to which he belonged while amongst us.

He is a feather in the cap of the whole human race—and Yugoslavia and America can be specially proud of him.

A few years ago a fellow scientist of Tesla's—Dr. A. B. Behrend, also an American—wrote about him in his book on the induction motor—the motor which owes its existence to Tesla and which now is in the very center of nearly everything that moves on wheels in this country.

Said Dr. Behrend: "Were we to eliminate from our industrial world the results of Tesla's work, the wheels of industry would cease to turn, our electric trains and cars would stop, our towns would be dark, our mills and factories dead and idle. So far-reaching is his work that it has become the warp and woof of industry. Should Tesla's work be suddenly withdrawn, darkness would prevail and we would slum into barbarism."

So it is true—Tesla is not dead. He is very much alive amongst us.

Among us is the triumph of his life, his achievement which we celebrate here.

We do not honor him, we are gathered to feel the triumph of one human life, and to share our feeling with those listening in.

This tribute to Nikola Tesla written by Louis Adamic was read by the Hon. Fiorello LaGuardia, Mayor of New York City, over station WYNC on Sunday, January 10, 1943.

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LOUIS N. ROWLEY, EDITOR • MAY 1955 • ESTABLISHED 1882

Power

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Strange Genius

ASK ANY GROUP of power men to name those who laid the foundation for today's electrical generation and distribution. You'll wind up with an impressive list—Edison, Brush, Thomson, Westinghouse, many others. But there is almost sure to be a significant omission.

Yet this forgotten man conceived the polyphase ac motor—still basic—and devised a suitable system of generation and distribution for applying it. To grasp the magnitude of this contribution, we must turn back to the 1880's when the electrical era was being born, and the "battle of the systems" held sway.

Arc lights and motors were being operated on constant-current series systems. Edison's Pearl Street generating station had opened in 1882, supplying incandescent lamps and, later, dc motors on a constant-potential system. Under the leadership of Westinghouse and Stanley, the advantages of ac distribution were demonstrated. But there was no successful ac motor.

In May, 1888, a young Yugo-Slav engineer, but four years in the United States, read a paper before the American Institute of Electrical Engineers. In it he described a new ac system. Its heart was the induction motor with its basic and beautiful concept of the rotating magnetic field. The man was Nikola Tesla, the system he described was destined to sweep the field.

With characteristic vision, George Westinghouse realized the fundamental importance of the polyphase ac system and acquired the basic patents. Its first impact on the general public was at the Chicago World's Fair of 1893. There a 2-phase generator supplied motors and lamps, and, through rotary converters and motor-generators, a variety of dc equipment.

But it remained for the Niagara Falls power project to demonstrate in the most dramatic way possible that polyphase ac was the system of the future. Since 1886 when a charter to develop its power had been granted, the eyes of the world had been on Niagara. An international commission, headed by Lord Kelvin, had reviewed 17 proposals, found none acceptable. Later, just five years after Tesla's AIEE paper, it was officially decided to use the polyphase system.

In August, 1895, Niagara power was delivered to the first industrial customer and in 1896 ac transmission to Buffalo, 22 miles away, was begun. By that time, the steam turbine had been introduced in America and the modern age of electric power had truly opened.

For Nikola Tesla, these far-reaching inventions were but a beginning. Still to come was brilliant work in high frequencies, thinking basic to much of today's radio art. Yet by the time of his death in 1943, both he and his work had begun to slip into obscurity. Why?

A man of flashing insights and enormous brilliance, Tesla was largely indifferent to the development of his ideas. This he left to others while he followed the lure of new challenges. In later years, his projects became more grandiose, his ways more mysterious, his pronouncements more Olympian. And working alone, as he did, he formed none of the institutional ties that help to perpetuate a record of accomplishment.

Next year—July 10, 1956—will be the 100th anniversary of Nikola Tesla's birth. It would be fitting for our engineering societies to commemorate this occasion, to acknowledge our debt to this strange and lonely genius who changed our world for the better.

(REPRINTED BY PERMISSION)

POWER • MAY 1955

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Clippings, printed material

TESLA MEMORIAL

FOR PUBLICATION JUNE 26, 1956

Nikola Tesla, world famous inventor and discoverer--who secured over 900 patents--was born July 6, 1856 at Smiljan, Serbia, (now Yugoslavia). He died in New York, January 7, 1943, at the age of 87. On July 6, 1956, the world celebrates the 100th anniversary of his birth.

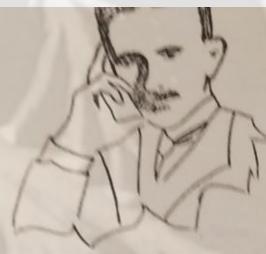
The Tesla Memorial measures 24 inches high. It was designed by Hugo Gernsback, publisher of RADIO-ELECTRONICS magazine. As the owner of Tesla's original plaster of Paris death mask, Gernsback had it heavily electroplated with copper, a process that took 10 days. This will preserve it for posterity. The heavy mask now, weighing 15 lbs., is mounted on a marble composition pedestal executed by the renowned sculptor Onorio Ruotolo. Three medallions commemorate Tesla's greatest inventions: the Tesla Oscillation Transformer; the first A.C. Induction Motor; the Tower for Wireless Power Transmission.

The memorial was unveiled by His Excellency Leo Matosy, Ambassador of Yugoslavia, on June 25, in the offices of RADIO ELECTRONICS, New York.

Please watch photo credit: © 1956 by RADIO-ELECTRONICS Magazine, New York

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THE NIKOLA TESLA CENTENNIAL
1856-1956



This year, American scientific and engineering societies, and the nations of the world, honor the centennial year of the birth of Nikola Tesla. The contributions of Tesla to science, industry, and to this country have manifested themselves in our every-day lives and remain as monuments to his outstanding achievements.

1885-1887. Tesla invents the "third-brush" method of d.c. generator regulation. Develops and obtains patents on improved arc lamps and lamp systems.

1888. Tesla presents the Polyphase System of a.c. power transmission, which has since become universal, embracing the entire field of constant-speed synchronous, induction, and split-phase motors. His genius was instrumental in creating a wonderful industry—wonderful in the ingenuity of the apparatus used in power transmission over long distances, and wonderful in the broad applications which have been, and continue to be, directing factors in modern engineering practices.

1889-1890. Tesla develops thermo-magnetic and pyro-magnetic generators. Develops method of obtaining direct from alternating currents.

1891-1893. First public announcement of researches on the phenomena of alternating currents of high frequency and potential. Out of his famous "tri-series" of lectures delivered in America and in Europe came these pioneering discoveries and inventions:

- a) Construction of neon signs and display of cold-light, fluorescent lamps,
- b) Demonstrations of the safe, physiological effects of currents of high frequency and high potential,
- c) The first announcement of a system of radio transmission comprising the essential tuned coupled circuit and aerial-ground connection elements,
- d) Introduction of the "Tesla Coil," to become the progenitor of a myriad of discoveries in related scientific fields,
- e) The phenomena and method of high frequency induction heating,
- f) The recognition of stranded wire and the use of oils in high frequency, high potential circuit applications.

1895-1897. Discoveries in radiations, material streams, and emanations, contributing to the fundamental understanding of X-ray and atomic radiations. Electro-mechanical synchronous generators for a.c. electric time systems. With two fundamental patents, Tesla introduced the key "four-tuned circuit system" of radio transmission and laid the basis for the development of the radio art.

1898. Tesla develops and patents a system of radio control of remote objects. Operates a crewless, submersible craft in the open sea near New York, creating the science of "guided missiles and weapons." Develops high frequency circuit controllers, detectors, discharges ever achieved by man, surpassing natural lightning. Discovery of standing waves in the earth, and means to produce intense electrical activity from this effect.

1899. Conducts secret researches at Colorado Springs. Produces most powerful electrical waves in the earth, and means to produce intense electrical activity from this effect.

1900-1905. Erects famed Long Island Research Laboratory at Wardenclyffe for the purpose of experimenting with wireless power transmission.

1905-1913. Researches and patents on a new mechanical principle, embodied in a variety of machines as reversible gas and steam turbines, mechanical transformers, and pumps.

1915-1917. Researches on ultra-high speed turbines in the range of 40,000 R.P.M. Patent on a system of wireless transmission of electric power.

1918-1931. Announces a method of inter-planetary power transmission. Patents on heli-copters, speed indicators, frequency and flow meters, and lightning protectors.

1932-1942. Research studies in telegodynamics and ultra-high voltage d.c. power transmission system.

1943. Death at 86, January 7, 1943, New York City.

(complete)



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f) The recognition of stranded wire and the use of oils in high frequency, high potential circuit applications.

1894-1897. Discoveries in radiations, material streams, and emanations, contributing to the fundamental understanding of X-ray and atomic radiations. Electro-mechanical isochronous generators for a.c. electric time systems. With two fundamental patents, Tesla introduced the key "four-tuned circuit system" of radio transmission and laid the basis for the development of the radio art.

1898. Tesla develops and patents a system of radio control of remote objects. Operates a crewless, submersible craft in the open sea near New York, creating the science of "guided missiles and weapons." Develops high frequency circuit controllers, detectors.

1899. Conducts secret researches at Colorado Springs. Produces most powerful electrical discharges ever achieved by man, surpassing natural lightning. Discovery of standing waves in the earth, and means to produce intense electrical activity from this effect.

1900-1905. Erects famed Long Island Research Laboratory at Wardenclyffe for the purpose of experimenting with wireless power transmission.

1906-1913. Researches and patents on a new mechanical principle, embodied in a variety of machines as reversible gas and steam turbines, mechanical transformers, and pumps.

1914-1917. Researches on ultra-high speed turbines in the range of 40,000 R.P.M. Patent on a system of wireless transmission of electric power.

1918-1931. Announces a method of inter-planetary power transmission. Patents on helicopters, speed indicators, frequency and flow meters, and lightning protectors.

1932-1942. Research studies in telegodynamics and ultra-high voltage d.c. power transmission system.

1943. Death at 86, January 7, 1943, New York City.

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INFORMATION BULLETIN

The Library of Congress

Washington 25, D.C.

Vol. 21, No. 2

January 8, 1962

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Acquisition Notes

Nikola Tesla Papers. Microfilm copies of the correspondence of Nikola Tesla, the famous scientist-inventor, have been obtained from Yugoslavia by the Manuscript Division. In them there is this letter of November 17, 1898, from Mark Twain:

Have you . . . patents on that destructive terror which you have been inventing? . . . Here in the hotel the other night when some interested men were discussing means to persuade the nations . . . to disarm, I advised them to seek something more sure than disarmament by perishable paper contract--invite the great inventors to continue something against which fleets and armies would be helpless, and thus make war thenceforth impossible. I did not suspect that you were already attending to that, and getting ready to introduce into the earth permanent peace and disarmament in a practical and mandatory way.

The letter was sent to Tesla in New York from Vienna, where Twain was lecturing and discussing, on the side, the perennial problem of world peace. Tesla was convinced that he could transmit power by wireless, and his friend Twain had thrilled at the prospect of a weapon that would outlaw war.

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Nikola Tesla was the beau idéal of the inventor-scientist of his generation. In the age of Edison, Steinmetz, Bell, Pupin, and Marconi, he was the handsome, daring, dramatic, speculative genius of the laboratory to whom all the world looked for answers to the challenging problems of the new century. But the resultant fascinating correspondence was taken to his birthplace in Yugoslavia after his death and had thus been lost to American scholars. Recently, however, a Nikola Tesla Museum has been established in Belgrade, and through the facilities of microfilm the letters are now available to readers in the Manuscript Division.

In the first generous sample to reach the Library, there is correspondence with George Westinghouse; Pierpont Morgan, the financier; his lawyer, George Scherff; his literary friend and poet, Robert Underwood Johnson; and his admirer, Mark Twain. The letters to him reveal the high regard in which his contemporaries held him. The letters he wrote show the amazing drive, vaulting ambition, agonies, and frustrations of a brilliant genius, whose inventions did so much to change the world. There are 2,340 microfilm frames, with more to follow, through which the impact of science on the 20th-century world can be studied. [C. Carroll Hollis]

Events in the Offing

The New York Chamber Soloists, the distinguished group of vocalists and instrumentalists that has performed a number of times at the Library, will return on Friday evening, January 19, under the auspices of the Elizabeth Sprague Coolidge Foundation in the Library of Congress, to present another unusual program of classical and modern music. The presence of Adele Addison, soprano, and Charles Bressler, tenor, will make possible the performance of rarely heard vocal compositions. The complete program follows:

Hendel	- Cantata "Crudel tiranno Amor"
Laderman	- Quartet for oboe & strings
Haydn	- Scotch & Welsh airs, for solo voice and duet
Bach	- Cantata "Jauchzet Gott."

The concert will begin promptly at 8:30 p.m. in the Coolidge Auditorium and will be broadcast in its entirety by Station WGBS-AM-FM of Washington.

Tickets will be distributed by the Hayes Concert Bureau, 1108 G Street, N. W., beginning at 8:30 a.m. on Monday, January 15. A service charge of 25 cents is placed on each ticket, and only two tickets are distributed to an individual. Telephone reservations may be made on Monday morning by calling District 7-4387. Mail orders are not accepted.

Jean de Rigault and the Théâtre de Paris Company will present one performance of Jean-Paul Sartre's "Huis-Clos" and Eugène Ionesco's "La Cantatrice Chauve" in the Coolidge Auditorium at 8:30 p.m. on Monday, January 22, to an invited audience. The program, sponsored by the Gertrude Clarke Whittall Poetry and Literature Fund in the Library

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of Congress, will be given in French; both plays will be presented in costume.

The Tréteau de Paris Théâtre Company is touring the United States under the sponsorship of the Government of the French Republic through L'Association Française d'Action Artistique and with the cooperation of the French Cultural Services in the United States and of Edouard Morot-Sir, Cultural Counselor to the French Embassy, who also serves as his country's representative of French universities in the United States.

"Huis-Clos" ("No Exit") had its initial performance in Paris in May 1944; Tania Balachova, who starred in the role of Ines in the original cast, will serve as the director for this production. In 1947, the play was presented in New York City and received the New York Critics Circle Award as the best foreign play of the season.

"La Cantatrice Chauve" ("The Bald Prima Donna") was produced in Paris in 1950 by Nicolas Bataille, who played the role of Mr. Martin in the original production and who will direct this production.

The players who will appear in the French Company are Jean-François Calvè, Francis Lax, Danièle Lebrun, Jacques Legré, Marguerite Perrin, Negro Verdier, and Jacqueline Staup.

Jean de Rigault, founder and manager of the Tréteau de Paris company on its North American tour, brought the Théâtre du Vieux-Colombier of Paris to the Library of Congress in March 1960 in a presentation of Molière's "Le Misanthrope."

A few tickets will be available to members of the staff on a first-come, first-served basis, but staff members must visit the Poetry Office in person to obtain them; telephone calls will be not accepted.

Library of Congress Publications

Catalog of Copyright Entries. Third series, vol. 15, no. 1, January-June 1961. 1961. Part 6: Maps and Atlases. (vii, 93 p.) Part 11B: Commercial Prints and Labels. (vii, 79 p.) For sale by the Superintendent of Documents, Government Printing Office, Washington 25, D. C.: Part 6, 50 cents for this issue or \$1 a year; Part 11B, \$1 for this issue or \$2 a year.

Chinese Scientific and Technical Serial Publications in the Collections of the Library of Congress. Science and Technology Division. Revised edition, 1961. (v, 107 p.) For sale by the Government Printing Office at 65 cents a copy.

This bibliography of Chinese serials in science and technology, compiled by Joan Wu, is based entirely on titles in the collections of the Library of Congress. The first edition was issued in 1955, and the present edition contains approximately twice as many entries as its predecessor and is designed as a practical guide to LC's holdings.

The list is arranged by subject in seven major sections, five of which contain several subsections. Within each unit the entries are arranged alphabetically. The following information is provided for each serial: title, publisher, place of publication, frequency, title

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changes, if any, and LC holdings. To facilitate use of the materials, the Library of Congress call number, or the special call number for materials in the custody of the Orientalia Division, is also cited. There are two titles indexes, one for the Wade-Giles and mainland Chinese romanized titles and the other for the English and Latin titles of English-language publications.

Library of Congress Classification--Additions and Changes. List
123, July-September 1961. (29 l.) For sale by the Government Printing
Office.

Personnel

Appointments: Russell D. Anderson, reprint file clerk, GS-2, Card, P6843; Alen Henry, control room attendant, GS-1, Ser, OP258; Mary P. McCarthy, arranger-mounter, GS-3, Cat M, OP216; Joanne M. Papada, clerk-typist, GS-3, GR&B, P6935; Daniel G. Partan, legal analyst, GS-11, LRS A, P6899; Charles J. Puckar, card drawer-biller, GS-3, Card, P6823; Claude R. Swanson, labeler, GS-2, Subj Cat, OP225; Leslie H. Wright, card drawer, GS-3, Card, OP196; John J. Zampella, editorial clerk, GS-4, AID, P6907.

Temporary Appointments: Samuel Garner, mail clerk, GS-2, LRS D; Warren T. Gregory, document control clerk, GS-3, AID; Donald F. Taylor, labeler, GS-2, Subj Cat, OP225.

Reappointment: Mrs. Dorothy D. Clark, research analyst, GS-9, AID.
Promotions: Stephen P. Bourland to map titler, GS-5, Map, P6918; Albert J. Gilbert, Jr., Cop Cat, to editorial assistant, GS-4, Ser, P6916; George E. Hungerford to reference files reviser, GS-4, LRS L, P6875.

Temporary Promotion: Mrs. Sara H. Grant to division secretary, GS-5, LRS L.

Transfers: Thomas A. Brown, Ser, to card drawer, GS-3, Card, OP196; Mrs. Betty T. Dewees, Cop Exam, to section secretary, GS-4, Cop Ref, P6900; K. Z. Furness, EdG, to subject cataloger-translator, GS-9, Cyr, P6819; William R. Lees II, SKR, to deck attendant, GS-2, AID; Mrs. Maria Ness, Ser Rec, to preliminary cataloger and searcher, GS-5, Desc Cat, P6890; Jindrich Nosek, EdG, to subject cataloger-translator, GS-9, Cyr, P6819; B. V. Popovitch, EdG, to subject cataloger-translator, GS-9, Cyr, P6819; Joseph Schall, EdG, to subject cataloger-translator, GS-9, Cyr, P6819; Francis S. Wagner, EdG, to subject cataloger-translator, GS-9, Cyr, P6819; Charles Zalar, EdG, to subject cataloger-translator, GS-9, Cyr, P6819.

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Resignations: Edward A. Camp, Ser Rec; Mrs. Valariee Griffith, LRS D; Robert T. Hall, LL; J. Clement Lapp, LRS F; Mrs. Ruby M. Lee, Cop Serv; Gaylord L. Mercer, Cop Ref; Calvin Shore, STAR.

List of Vacancies: Aerospace Information Division--**P6879, GS-9 bibliographer; **P6934, GS-7 reference librarian. Copyright Office--P6758, GS-5 music cataloger. Descriptive Cataloging Division--P6958, GS-7 cataloger; **P6933, GS-7 or 9 manuscripts cataloger. Personnel Office--P6862, GS-13 classification officer. Science and Technology Division--**P6896, GS-12 project supervisor; P6899, GS-11 Slavic science acquisition specialist; P6836, GS-15 science specialist; **P6774 bibliographer and science specialist, GS-11; P6835, GS-15 science specialist; P6902, GS-14 assistant chief. (**Indefinite Appointment.)

Classification Actions Resulting in Promotions: CALC--international library relations assistant to GS-10. LRS Ed--education analyst, GS-9 to GS-11; analyst, public welfare, GS-7, to analyst, social legislation, GS-11; reference assistant, GS-5 to GS-7; EG--reference assistant, GS-7, to report- and speech-writer, GS-9. Proc Un Cat--Post-1951 Imprints Section, supervisor, Editorial Typing Unit, to GS-7; Desc Cat--Preliminary Cataloging Section, reviser to GS-8. Ref AID--Division Office, supervisor, Duplicating Unit, to WP-12; Mss--Office, secretary to GS-5; GR&E--special assistant for poetry to GS-10.

Staff Activities

Conrad C. Reining of the African Section, General Reference and Bibliography Division, was rapporteur on a panel on "Anthropological and Sociological Aspects of Technological Change" on December 30, during the fourth annual meeting of the Society for the History of Technology, which was held in Washington, D. C., in conjunction with the annual meeting of the American Historical Association.

Walter W. Wilcox, Senior Specialist in Agriculture, has just returned from a 9-week trip to Tanganyika, where, as a Consultant on the Staff of the Food and Agriculture Organization of the United Nations, he advised the government on the organization and staffing of a new Agricultural Planning Section in the Ministry of Agriculture.

Marko Zlatich of the General Reference and Bibliography Division has contributed plate no. 197 to the Military Uniforms in America series, published by the Company of Military Collectors and Historians of Providence, R. I. The full-color plate illustrates the uniforms worn by ship's officers of the Russian American Company in 1851 and is accompanied by a separate text-sheet giving additional details on the uniforms as well as a brief history on the organization of the maritime branch of the Russian American Company.

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National Federation of Federal Employees. Local 626 will hold its regular luncheon meeting at 12:15 p.m. on Monday, January 15, in Room 318 of the Main Building. All staff members are welcome.

Welfare and Recreation Association. The Cooking Club will hold its first meeting of 1962 at noon on Thursday, January 18, in Room 324C of the Main Building. The guest of honor will be WRA President Barbara Fisher, who has a message for the membership. The treasurer of the club, Mrs. Patricia Hines, wishes to remind members to pay their dues promptly, so that their names will be included in the forthcoming directory of the club.

The WRA Greek and Latin Discussion Group will meet at 1 p.m. on Thursday, January 18, in the Page School on the third floor of the Main Building. Harry Lee Hogan of the Education and Public Welfare Division of the Legislative Reference Service will briefly describe Congressional efforts to include classical languages within the scope of the National Defense Education Act of 1958.

The WRA Philatelic Club will meet at noon on Tuesday, January 16, in the Page School Library. The principal feature of the meeting will be a talk by WRA President Barbara Fisher.

WRA Duckpin Bowling League. The Defenders strengthened their first-place position last week by overpowering the Alley Busters in two out of three. For the victors, Roberta Lee rolled a 323-set (including 124 and 116), Sherman Redd rolled a 323-set (including 123 and 108), and Rita Harrison rolled 104. For the Alley Busters, substitute Eddie Fisher rolled a 302-set (including 118) and Fred Sloan 106.

The Woodchoppers moved into a tie for second place by sweeping all three from the shorthanded Mark IV's. Hank Lewis led his team with a 326-set (including 121 and 115); John McGee rolled a 316-set (including 122 and 101), Laverne Perritt 106, and Cookie McGee 101. For the Mark IV's, Skip Swinson rolled 106 and Catherine Bogan 101.

The Vagabonds are now riding on a 9-game winning streak, having upset the Latecomers in all three last week. Jimmy Stewart rolled a 314-set (103, 100, and 111), Sammy Washington a 312-set (103, 103, and 106), and Vince Trumpha 106. For the startled Latecomers, Pat Myers rolled 111.

In the skirmish between the Four Aces and the Two Pairs, the Four Aces came out ahead in two out of three, with Summett Trainor pacing the attack with a 327-set (including 116 and 112), assisted by Helen Langdon's 315-set (including 112 and 108) and Jim Williams' 111. For the Two Pairs, Paul Trainor rolled 102 and 100, Jane Miller 101, Louie Lawton 112, and Emma Samuels 124.

League Standings			
Team	Won	Lost	GB
Defenders	26	16	—
Latecomers	23	19	3

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Team	League Standings (continued)		
	Won	Lost	GB
Woodchoppers	23	19	3
Four Aces	21	21	5
Two Pairs	21	21	5
Vagabonds	21	21	5
Alley Busters	20	22	5
Mark IV's	13	29	6

[Emma E. Samuels]

Library of Congress Footnotes

New Adherents to the UCC. The Copyright Office has been informed by Unesco that on December 11, 1961, Paraguay deposited with the Director General its instrument of accession to the Universal Copyright Convention and to Protocols 1, 2, and 3 thereof. Word had also been received that on November 14 Nigeria deposited its instrument of accession to the Universal Copyright Convention only. In conformity with Article IX, paragraph 2, of the Convention, the UCC enters into force 3 months after deposit of the instruments--i.e., on February 14, 1962, for Nigeria and on March 11, 1962, for Paraguay.

Nigeria is the 39th country and Paraguay the 40th to adhere to the Convention.

Fair Employment Practices. The Librarian met with the administrative and supervisory personnel of the Library of Congress on Thursday afternoon, January 4, in the Coolidge Auditorium to report on and discuss the Library's policy and procedures in regard to fair employment practices.

Dr. Mumford emphasized that it has been the long-standing policy of the Library to prohibit discrimination--because of race, creed, color, sex, or lawful political affiliation--in employment, promotion, and employee relations. He pointed out that the Library's grievance procedure, including a board hearing, has been available to anyone who felt himself aggrieved because of alleged discrimination but that this machinery has not been used for this purpose during his administration. He described some of the distortions of fact and the erroneous conclusions in the articles alleging discrimination at the Library that were published last fall in the Washington Afro-American. He stated that, despite the ill-founded charges, he had issued a Special Order calling attention to the Library's policy against discrimination and to his belief in this policy and his determination to enforce it, and inviting anyone with a complaint to present it to him or to other Library officials.

As a result of this order, the Librarian received one anonymous letter, alleging discrimination against several Library employees. When this was thoroughly investigated, it was found that the facts were not accurately presented and that those named in the letter stated that they had not known their names were to be used, that they were used without their permission, and that in the cases cited they did not consider that they had been the victims of discrimination.

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The Librarian recounted how he and the Chief Assistant Librarian of Congress had held meetings with a self-constituted group of Negro employees, with its representative, and with a group selected by the Library to represent various grades and types of positions and every department in the Library. The Library's policy and procedures were also thoroughly discussed at the Librarian's Conference and otherwise with Library officials, Dr. Mumford said.

Although no concrete evidence of discrimination was presented, the Librarian reported, it was evident to him that there was some feeling among Negro staff members that they were not receiving the same consideration in employment opportunities as white employees. Consequently, the Librarian decided to designate a Fair Employment Practices Officer, who would undertake studies of employee practices in the Library with a view to identifying any areas which might need attention. He would also hear complaints and resolve them informally if possible. If this should not be possible, or if the employee should wish to appeal the decision, he might then have recourse to a board, established in accordance with the Library's grievance procedures (General Order No. 1758). The Fair Employment Practices Officer would report directly to the Librarian, and any board established would also make its recommendations to the Librarian. In establishing the position of the Fair Employment Practices Officer, the Librarian explained, he is paralleling the Executive Branch's program and is providing an additional avenue for handling complaints; an employee may still take his case to the Personnel Relations Section in the Personnel Office if he wishes. In providing for a board hearing when necessary, the Library's plan goes beyond that of the Executive agencies' programs.

Dr. Mumford summarized efforts to obtain qualified Negro applicants; he stated, however, that Negroes will not be appointed or promoted simply because they are Negroes but only because they are the best qualified candidates. He emphasized the importance of scrupulously fair performance ratings and the necessity of analyzing in documents recommending appointments and promotions not only the qualifications of the person recommended but of all those considered.

Before throwing the meeting open for questions, the Librarian again stressed the responsibilities of supervisors. "There is no better answer to allegations of discrimination than to deal fairly with all employees and to promote them strictly on the basis of merit," he said. "The employees of the Library have a right to expect nothing less than this, and I expect you, as supervisors, to live up to this objective."

News in the Library World

The District of Columbia Library Association will hold its January membership meeting at 8 p.m. on Thursday, January 18, in Federal Office Building No. 6, 400 Maryland Avenue, S. W. (Rooms 1-C-084 and 1-2-084). A panel discussion on "New Educational Media and Other Office of Education Resources Related to Leadership" will be moderated by C. Walter Stone, Director of the Educational Media Branch of the U. S. Office of

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Education. Other panel members will include Gerald Smith of the Cooperative Research Branch and John C. Frantz of the Library Services Branch. All area librarians are invited to attend.

Medical Library Center of New York. Dr. Howard Reid Craig, President of the Medical Library Center of New York and Director of the New York Academy of Medicine, has announced that an 8-story garage and loft on East 102d Street has been purchased to house a new medical library center which will serve medical schools and research institutions in the New York area. Grants from the Avalon Foundation, the Commonwealth Fund, the John and Mary R. Markle Foundation, the James Foundation of New York, and the Health Research Council of the City of New York had provided the initial financing for the new organization. The new center will provide for the libraries of its participating organizations the additional storage space and services needed to keep up with the steadily increasing output of medical and scientific literature.

A conference of more than 100 medical librarians at the New York Academy of Medicine in 1958 urged that such a medical library center be set up near the Academy's library, because of its central location and its large resources. Later, meetings with the heads of medical schools and research institutes led to the center's establishment; participating members are the five medical schools—Columbia University, Cornell University, Albert Einstein College of Medicine, New York University, New York Medical College, the Rockefeller Institute, the Memorial Sloan-Kettering Cancer Center, the New York Academy of Medicine, and the Department of Health of the City of New York.

An initial staff of three, under the direction of Erich Meyerhoff, former librarian of the Downstate Medical Center in Brooklyn, has been working since last spring on plans and policies for the center from temporary quarters at the New York Academy of Medicine. Under a grant from the John A. Hartford Foundation, one of the first projects is the preparation of a union catalog of all periodicals in medicine and allied sciences held by libraries in the New York area. This will be printed and distributed to the participants.

The staff expects to move to their new quarters early next summer after conversion of the sixth and seventh floors for library purposes. The remaining six floors will continue to be rented for commercial purposes. The building's address is 5-17 East 102d Street.

The Eleutherian Mills-Hagley Foundation, Inc., of Wilmington, Del., has announced, through its president, Emile F. du Pont, the retirement on December 31, 1961, of Charles W. David, director of the Eleutherian Mills Historical Library, and the appointment of his successor, Richmond D. Williams, associate director of the library.

The new library, which is situated on the Brandywine near the site of the original du Pont residence at "Eleutherian Mills," was dedicated on October 7, 1961. Its collections include du Pont family and business records for the past century and a half, and there is also a sizable collection of industrial records of other manufacturers of the Brandywine

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and surrounding area. The library is expected to become a center of research for historians studying the industrial history of eastern Pennsylvania, southern New Jersey, northern Maryland, and Delaware.

Dr. David was director of the former Longwood Library from 1955 until that organization merged earlier this year with the library of the Hagley Museum and was renamed the Eleutherian Mills Historical Library. He was a leader in organizing the Philadelphia Biographical Center and Union Library Catalogue and was chairman of its board from 1936 to 1940 and again from 1949 to 1959.

A Rhodes scholar, with a doctorate from Harvard University, Dr. David has had a distinguished career, combining teaching, historical research, and librarianship, and he is the author or editor of numerous books. Most recently he edited A Journey to France and Spain, 1801, a journal kept by Victor du Pont, which was issued by the Cornell University Press in conjunction with the dedication of the new Eleutherian Mills Historical Library. Dr. David served a 5-year term as Executive Secretary of the Association of Research Libraries, and he is a member of numerous professional organizations.

Dr. Williams was named associate director of the Longwood Library in May 1961, having come to that post from the American Association for State and Local History, where he was assistant director for 1 year; during that period he completed a survey of historical societies in the United States. Prior to that time he was director of the Wyoming Historical and Geological Society in Wilkes-Barre, Pa.

Dr. Williams was graduated from Williams College in 1950, following military service (1945-47) as an officer in the U. S. Army Corps of Engineers. He received his M. A. in history from the University of Pennsylvania in 1952 and his doctorate from the same institution in 1959. While completing his doctorate, he returned to Williams College from 1954 to 1956 as an instructor in history and as assistant dean.

The Henry E. Huntington Library and Art Gallery of San Marino, Calif., recently reported that Robert Oliver Schad, Curator of Rare Books and Secretary to the Board of Trustees, died at his home in Pasadena on December 25.

Mr. Schad was well known in the rare-book world both in this country and abroad, particularly for his knowledge of early English books and early Americana. His 44-year term of service began in 1917, when he was employed by Henry E. Huntington as assistant cataloger of his private library in New York, and he came to San Marino in 1920, when Mr. Huntington moved his collections to that location. Since 1926 Mr. Schad had been Curator of Rare Books, and, at the time of his death, he was also Administrator of Exhibitions, as well as Secretary to the Board of Trustees.

CLR Reviews 5 Years. That librarianship is indeed a science--and one of many branches--is reflected in the 5th Annual Report of the Council on Library Resources, Inc., which reviews in this 66-page publication its first 5 years of existence as well as its projects of the

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year ending June 30, 1961. In its wide-ranging attacks on the headaches with which librarians must deal in administering 20th-century libraries, CLR has studied and granted funds for 155 projects, whose titles reveal that librarians need a working knowledge of electronic telecommunication, the materials and processes for dry photocopying, automatic text searching, trade barriers to the international flow of books, patterns in the use of research books, legal problems in photocopying in libraries, the causes of deterioration in book-papers and the content of durable paper (developed in a CLR project), the content of catalog card stock, mechanized indexing, standards and tests for library equipment and systems, and how to plan library buildings and furniture. These are but a few of the subjects listed in a 24-page Appendix A, "Projects by Subject, 1956-1961." Also to be found there are references to the more traditional bibliographic problems that laymen ascribe to librarians; that these are on a scale that would shock any layman who thinks of librarians in 19th-century terms is partially reflected in such phrases as "international co-ordination of cataloging rules," a "record of serials in the libraries of the United States and Canada," an "international inventory of musical sources," the "cooperative acquisition of foreign publications," or a "national record of manuscript collections."

The report catalogs grants and contracts totaling \$3,922,097 during 5 years--of which \$1,557,293 was for the last fiscal year. The text opens with a chapter entitled "The First Five Years," by CLR President Verner W. Clapp, and a chapter describing "New Projects" follows. The appendix referred to above contains within its listings a bibliography of articles and publications resulting from CLR projects. The paper-bound booklet, attractively designed with the bookplates of some 40 libraries reproduced on its endpapers, may be obtained free from the Council on Library Resources, Inc., 1025 Connecticut Avenue, N. W., Washington 6, D. C. (District 7-8877).

"Library 21" at "Century 21." An automated Library of the Future, designed by the American Library Association in cooperation with leading firms in the electronics field and employing the latest techniques in storage and retrieval of information, will be on display at the "Century 21" World's Fair in Seattle, which opens on April 19, 1962, for a period of 6 months. (See the Information Bulletin of August 21, 1961, vol. 20, no. 34, p. 504.)

"Library 21" will show how technological change will introduce a new dimension in library programs, and the ALA hopes to project Fair visitors into a 21st-century library environment by demonstrating the dynamic role which the library of tomorrow will play in the field of information communication.

Electronic machines are currently being packed with information by librarians, so that questions on nearly every conceivable subject will receive prompt, accurate response. Through these machines, visitors will be able to query the great minds of the Western World on a variety of subjects, and teaching machines, as well as closed-circuit television, will play their part in the library of the future.

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"Library 21" is a prototype of the six or seven core libraries designed to service vast areas of the Nation in the next century. These central libraries will be tied together in a communications network and will provide service to virtually all libraries in their regions so that every important document, book, pamphlet, and other piece of information will be available to every library user no matter where he might reside.

A children's world, adult reading area, and learning resources center equipped with programmed learning devices and the newer educational media also will be included in ALA's 9,000-square-foot exhibit area in the Coliseum, an 11-story building with no interior columns.

Visitors to "Library 21" will walk up ramps or be carried by a "cloudalator," into a cloud nebula, located over a water-filled reflecting pool. Inside the cloud the visitor will view capsule displays which are featured in the lower exhibit area of the Coliseum. Upon leaving, the visitor moves into the 21st-century library, the first exhibit entered on the ground level of the Coliseum.

A history center for adults will be able to reproduce photographs of original events, for example, by date of the event; and local, national, and international maps and charts will be furnished at the exhibit with a micro-form facsimile appearing on a TV screen, and, at the press of a button, the facsimile will disappear and a reproduced copy reappear.

Approximately 72 selected librarians from all parts of the country will be brought to Seattle in groups of 12, as part of the "Library 21" project for a program of instruction at the University of Washington's School of Librarianship in information retrieval and the fundamentals of the newer educational media. Following a 1-week course, each group of 12 librarians will serve for 1 month as professional staff at the exhibit and help to interpret the unique library concepts dramatized by industry for the public. This "crash" educational program, financed through an \$82,593 grant from the U. S. Office of Education, is designed, in part, to help bring the profession abreast of the developments in automated techniques in order to cope with the "explosion of knowledge." The grant will provide travel funds and per diem payments for the professional librarians who will take the course and staff the exhibit. Professional librarians interested in making application should write immediately to Dr. Irving Lieberman, Director of the School of Librarianship, University of Washington, Seattle 5, Wash.

"Library 21" was stimulated by a grant from the Ford Foundation's Council on Library Resources, Inc., and Joseph Becker of Washington, D. C., has served as Coordinator, receiving advice from an advisory committee of distinguished librarians under the chairmanship of Dr. Lieberman.

Notes on Publications

Publications mentioned in this column are available in the Library's collections for the use of its readers and are noted here in order to call them to the attention of the staff. The Library of Congress does not distribute these publications.--Editor

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Vol. 21, No. 2, January 8, 1962

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New Reference Books. To the reference collections in the past several weeks have been added, among others, the items discussed in the following paragraphs; all are available in the Main Reading Room.

William Barnes and John Heath Morgan are the authors of The Foreign Service of the United States; Origins, Development, and Functions (Washington, Historical Office, Bureau of Public Affairs, Department of State, 1961, Department of State Publication 7050, Department and Foreign Service Series 96, 430 p., index). An account of the historical development of the service is followed by a description of the role and structure of the present-day organization, its conditions of service, and the career opportunities it offers. Statistical tables, charts, and other data are contained in extensive appendixes, and there is a bibliography. The volume will serve as a useful reference work for the student of American history and international relations who is interested in the development of the foreign service as a background for studies in those fields.

Molders of the Modern Mind; 111 Books That Shaped Western Civilization (New York, Barnes and Noble, Inc., 1961, 396 p., index), by Robert Bingham Downs, Director of the Graduate School of Library Science and Dean of Library Administration at the University of Illinois, is an expansion of the author's Books That Changed the World (Chicago, American Library Association, 1956), which was translated into five languages. Beginning with the assumption "that culture and civilization of modern man have been guided and shaped by the thought of a limited number of individuals," Dr. Downs shows how the printed works of such men--scientists, philosophers, essayists, and poets--have affected the Western World. The book is divided into four parts: "The Renaissance and Reformation," "Enlightenment, Reason, and Revolution," "The Bourgeois Century," and "Making the Modern World." An introduction to each part discusses the historical background and outlines the main intellectual currents of the period. Each of the 111 chapters treats of a book by a different author and includes biographical information, a résumé of the work, and a consideration of its significance in its own era and in more recent times.

Who's Who of Indian Writers (New Delhi, India, Sahitya Akademi, 1961, 410 p.) contains basic biographical and bibliographical data on living Indian authors. The information given for each author includes his titles and degrees, pseudonyms, date and place of birth, mother-tongue, education, present post or occupation, total number of books, titles of main publications, and address.

World's Who's Who in Commerce and Industry (Chicago, Marquis-Who's Who, 1961, 1358 p.) supersedes Who's Who in Commerce and Industry, which was published in 11 editions from 1936 to 1959, and contains biographical data concerning the leading figures in finance, industry, and trade throughout the free world. Appended is The Indexed Catalog of Selected Principal Businesses, which provides an alphabetical listing of firms selected on the basis of capitalization, high commercial rating, and outstanding management, with the names of the ranking executives.

Economic Areas of the United States, by Donald Joseph Bogue and Calvin L. Beale (New York, The Free Press of Glencoe, Inc., 1961, 1161,

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CLOXXVI p., photographs, maps, and tables), divides the country into 5 natural economic provinces, 13 regions within the provinces, 121 sub-regions, and 517 State economic areas, including a special group of metropolitan economic areas. A comprehensive description and statistical analysis of the socio-economic characteristics of each area is provided. [Thomas S. Shaw]

The National Science Foundation has issued a study entitled Publishing of Basic Research Findings in Industrial Firms, 1957-59, which shows the publication practices and policies of 174 companies performing a large share of the country's basic research. Both the policies themselves and a proper understanding of them by those who can use the results have an important bearing on the availability of research findings to the scientific community. The report notes that companies with liberal publication policies believe that reporting of research findings improves the prestige of the companies and the morale of the staff. When considerations of competitive advantage are involved, however, the disclosure of results may be delayed or the results may be withheld from publication. Data are given on the increase in research papers published during the years covered by the study and also on the relationship between dollar volume of research conducted and extent of publication. A copy of the report, designated as NSF 61-62, may be seen in the Science Reading Room or may be obtained from the U. S. Government Printing Office for 25 cents a copy.

A recent Soviet publication of marked interest to students of 18th-century intellectual history is the Soviet Academy of Sciences' Biblioteka Vol'tera, katalog knig, a catalog of Voltaire's library, which was sold to Catherine II after Voltaire's death in 1778 and which is now preserved in the State Public Library named for M. E. Saltykov-Shchedrin in Leningrad. Edited by Academician M. P. Alekseev and by T. N. Kopreeva, candidate of historical sciences, this work of more than 1,100 pages is alphabetically arranged by author or by the first significant word of the title; its 3,863 entries refer to 6,810 volumes in Voltaire's library, together with a number of manuscripts, collections of pamphlets or shorter printed works, and a list of books erroneously included in this library in previous lists or by oversight of the librarians. There is a summary in French, as well as a number of indexes, among which is one to Voltaire's marginal notes in these volumes. A copy of this volume is available in the general collections. [Robert V. Allen]

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Dr. techn. h. c.
NIKOLA TESLA
1856 — 1943

Technisches Museum
für Industrie und Gewerbe
Wien 1952

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Dr. techn. h. c.
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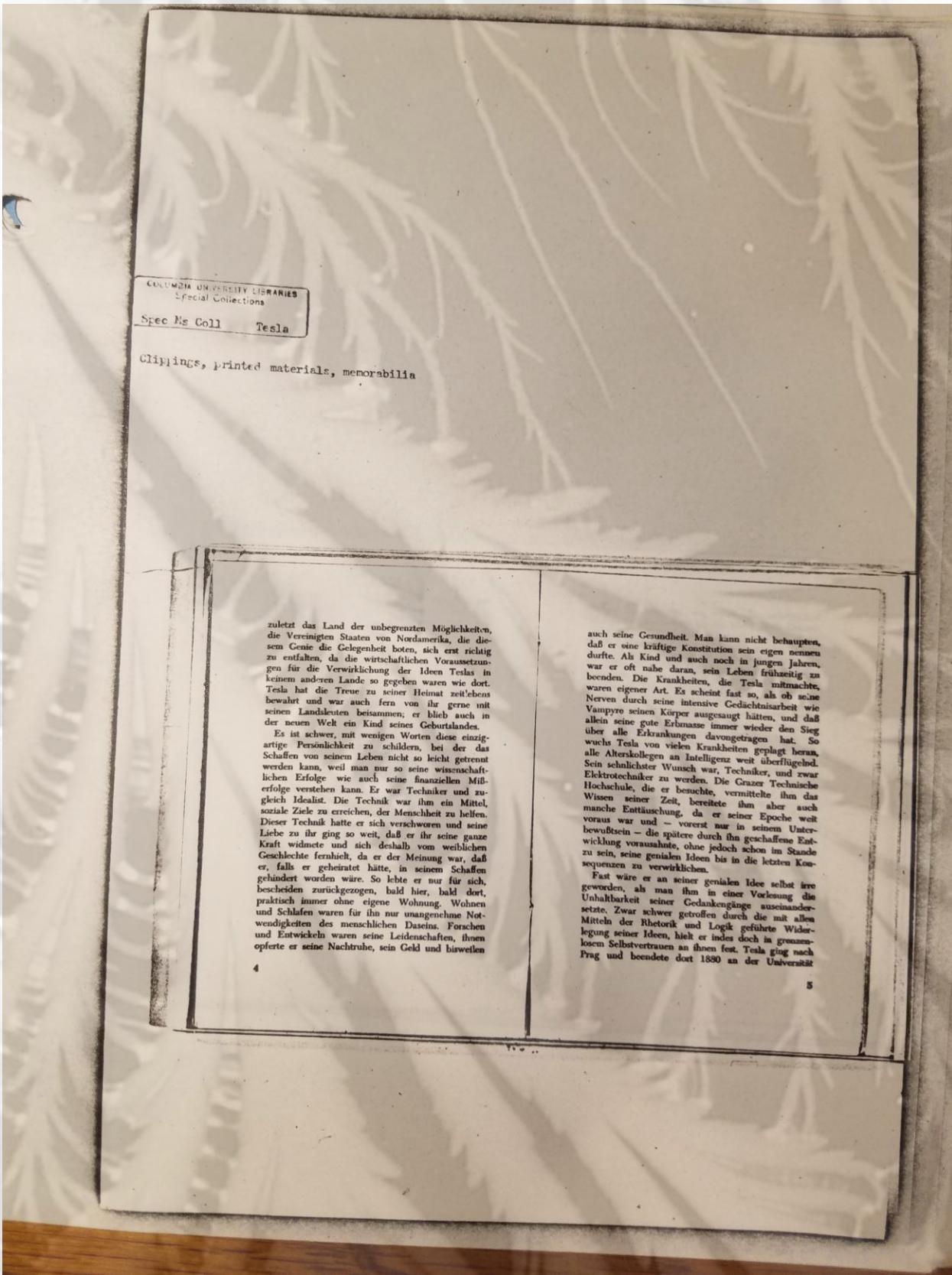
Printed in Austria

Druck: Alois Mally & Co., Wien V

Festrede anlässlich der Enthüllung der Nikola Tesla-Büste im Technischen Museum für Industrie und Gewerbe in Wien, gehalten von dessen Direktor Dr. Josef Nagler am 29. Juni 1892.

Hochansehnliche Festversammlung!

Wir haben uns heute hier zusammengefunden, um die Büste eines Mannes zu enthüllen, der einer der genialsten Menschen unserer Zeit war. Die Büste Nikola Teslas, die der berühmte jugoslawische, in Amerika lebende Bildhauer Ivan Meštrović modelliert hat, die in Zagreb gegossen wurde und von der jugoslawischen Regierung dem Technischen Museum aus Anlaß des in nächsten Jahr stattfindenden Internationalen Nikola Tesla-Kongresses gewidmet hat, die Büste eines Mannes, der zwar kein Nobel-Preisträger war, obwohl er es mehrfach verdient hätte, auf den die Welt aber stolz sein kann. Ein Mann, den drei Staaten für sich reklamieren. Österreich, weil Tesla als Ak.-Österreicher in einem damals zu Österreich gehörigen Orte, Smiljan, Provinz Slavonien, Kroatiens, im Jahre 1856 geboren wurde, in der alten österreichisch-ungarischen Monarchie, in Graz und Prag, studierte, in Wien im Jahre 1908 zum Doktor der technischen Wissenschaften ehrenhalber ernannt wurde und in Ungarn wissenschaftlich tätig war; Jugoslawien deshalb, weil der Geburtsort Teslas jetzt zu diesem Staat gehört; und nicht



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seine Studien. Nun erstrebte er eine Anstellung bei einer bedeutenden Firma, da er der Meinung war, nur in einem ganz großen Unternehmen Verständnis für seine Pläne zu finden. Er ging nach Budapest, aber er mußte dort annehmen, was sich ihm darbot, er war ja noch unbekannt – ein Absolvent der Hochschule – sonst nicht in den Augen der Industrie – ein Anfänger – Ja, er war ein Anfänger, aber ein Wegbereiter einer neuen Epoche der Elektrotechnik. Was Michael Faraday entdeckte, das baute Tesla aus. Der Wechselstrom hatte es ihm angeht. Schon nach zwei Jahren, im Jahre 1882, gelingt ihm der große Wurf, er entdeckt das Drehfeld. Wieder einmal erfäßt Tesla ein Täusel der technischen Begeisterung, ekstatische Freude, er weiß, er hat recht. Die Firma aber, bei der er arbeitete, wurde verkauft, und Tesla kam zum alliierten Unternehmen nach Paris. Er setzte große Hoffnungen auf Paris; dort, meinte er, sei der Ort, wo man für seine Ideen empfänglicher sein würde, von wo aus sich die Erfahrung in alle Welt ausbreiten könnte. Statt aber an seinem Drehfeld arbeiten zu können, mulpte er sich bei der Continental Edison Company dem Gleichstrom widmen. Er reparierte Gleichstrommaschinen und Motoren und wurde sehr bald Entstörer. Er konstruierte automatische Regler, half der Firma in schwierigen Situationen, hatte aber keinen Dank. In Straßburg, wo er für sie tätig war, konstruierte er einen Dynamo für Zweiphasen-Wechselstrom und einen Induktions-

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motor. Es war für ihn einer der erheblichsten Momente seines Lebens als der Motor, vom Generator gespeist, sich zu drehen begann, und als er die Umlaufrichtung des Drehfeldes änderte, sich in entgegengesetztem Sinne drehte. Tesla war damals erst 27 Jahre alt; er hielt eine Vorführung seiner Erfindung vor dem Straßburger Bürgermeister und den Straßburger Finanzleuten ab. Erfolg gleich Null – Nach Paris zurückgekehrt, erlebte er neue Enttäuschungen; man preßte ihm um sein gutes Recht. Obwohl Tesla das Geld nur als ein notwendiges Übel der Zivilisation betrachtete, war er von solchem Verhalten angewidert und kündigte seine Stellung.

Nun blieb ihm noch Amerika übrig. Dort hoffte er, für seine Ideen einen guten Boden vorzufinden. Aber auch hier hatte er anfanglich mit großen Schwierigkeiten zu kämpfen. Er kam mit Thomas Alva Edison zusammen. Doch diese zwei so genialen Köpfe waren grundverschieden in ihrem Wesen. Edison war Erfinder und gleichzeitig guter Kaufmann – Tesla war Entdecker, Erfinder und Idealist. Die Bekanntschaft, von einer Freundschaft kann man wohl nicht reden, dauerte nicht lange. Tesla zog sich zurück, und es war gut so für ihn, denn sein Genie konnte sich erst jetzt richtig ungehindert entfalten, gemäß dem Spruch: „Es bildet ein Talent sich in der Stille, sich ein Charakter im Strom der Welt.“ Tesla wurde arbeitslos und verdiente sich als Gelegenheitsarbeiter, ja sogar als Erdarbeiter, seinen karglichen Lebensunterhalt. Aber

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wie im Ratschluß Gottes nichts von ungefähr ist, so sollte auch diese Tätigkeit ihn weiterbringen. Ein Vorarbeiter der Erdarbeiter, dem er sein „technisches Herz“ ausgeschüttet hatte, führte ihn bei A. K. Brown der Western Telegraph Company ein. Brown sowie der Vorarbeiter opfertern sogar ihr ersparten Geld für Teslas Pläne. Aus dieser Bekanntschaft mit Brown entstand die Tesla Electric Company in der South Avenue 33-35 am heutigen West Broadway. Damit aber entbrannte der große Kampf: Gleichstrom – Wechselstrom, der zwar kein prinzipieller, sondern ein finanzieller Kampf war. Edison war ein aus geschäftlichen Gründen eingeschworener Anhänger des Gleichstroms, Tesla des Wechselstroms. Tesla konstruierte in seiner Firma Einphasen-, Zweiphasen-, Dreiphasen-Generatoren und -Motoren und legte seinen Konstruktionen exakte Berechnungen zugrunde. Professor W. A. Anthony von der Cornell University dokumentierte in seinem Gutachten über Teslas Zweiphasenmotor, daß derselbe einen Wirkungsgrad aufweise, der den besten Gleichstrommotoren gleichkomme. Durch die Patentanwälte Duncan, Curtis und Page hatte Tesla am 12. Oktober 1887 sein grundlegendes Patent auf dem Gebiete des Drehstroms angemeldet. Obwohl er schon vielen sein System erklärt hatte, hatte glücklicherweise dieses Wissen niemand zu Teslas Schaden ausgenutzt, da keiner geistig noch so weit war und die geschäftliche Chance des Wechselstromsystems erkannt hatte. Tesla ist damit der Vater des

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Drehstromes geworden. Seine Erfindung war dem Patentamt zu neu und zu umfassend, weshalb er sie auf ca. 30 Patente aufteilen mußte. Sein Vortrag vor dem American Institute of Electrical Engineers in New York, der den Titel trug: „Ein neues System von Wechselstrommotoren und -transformatorn“ ist weltberühmt geworden. Die Westinghouse Company hatte sofort die Vorteile des Wechselstromsystems erkannt und erworb Teslas sämtliche Patentrechte. Tesla arbeitete jetzt in dieser Gesellschaft. Ein großes Stück seines Lebenswerkes hatte er damit vollendet.

Wieder zog es ihn nach Europa. Die Weltausstellung in Paris bot ihm eine willkommene Gelegenheit und von hier aus fuhr er in seine Heimat, wo er fernab von dem Getriebs amerikanischer Großstädte seinen wohlverdienten Urlaub in seinem Geburtsorte verbrachte. Nach New York zurückgekehrt, arbeitete Tesla intensiv an dem Ausbau seines Wechselstromprojektes. Immer mehr erkannte man auch in Geschäftskreisen den großen Vorteil des Wechselstroms und seines Verteilungssystems. Hatten doch die von Edison erbauten Gleichstromverteilungsanlagen allerlei Nachteile: Spannungsabfälle in den Leitungen, dadurch nicht die gewünschte 110 Volt Netzspannung, infolgedessen schlechtes Licht. Wollte man den Spannungsabfall möglichst verkleinern, so mußte man große Leitungquer schnitte für die Stromführungen vorsezogen. Dies ergab aber ein teures Leitungssystem. Bei

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Wechselstrom war es anders, denn diese Stromart konnte man transformieren und das Produkt aus Strom und Spannung blieb praktisch konstant. Man konnte mit hohen Spannungen bei kleinen Strömen dasselbe erreichen wie mit niedrigen Spannungen und mit hohen Strömen. Die niedrigen Ströme bei hohen Spannungen brauchten aber nur einen kleinen Leitungsguerschnitt, waren somit wirtschaftlicher. Auch war man für die Erzeugung der Energie bei der Verwendung von Wechselstrom nicht mehr an die Nähe des Verbrauchers gebunden, man konnte fernab von der Verbrauchsstelle eine vorhandene Wasserkraftenergiequelle zur Wechselstromerzeugung heranziehen, den hochgespannten Wechselstrom mittels Leitungen kleinen Querschnittes bei niedriger Stromstärke über weite Strecken führen und ihn dann an der Verbrauchsstelle auf die niedrige Voltspannung bei großer Stromstärke herabtransformieren. Das Elektrizitätswerk war damit nicht mehr ortsgebunden.

Der Besitzer der Westinghouse Electric Company in Pittsburg erkannte die kommerziellen Aussichten des Teslaschen Wechselstromsystems und bot Tesla eine Million Dollar für die nunmehr auf die Zahl 40 angewachsenen Teslaschen Wechselstrompatente. Tesla war damit einverstanden, jedoch unter der Bedingung, daß ihm für jedes PS erzeugter Wechselstrommaschinen und -motoren 1 Dollar Lizenz bezahlt würde. Leider konnte er sich mit den Ingenieuren der Westinghouse Company nicht befreun-

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den, da diese auf seine wohlüberlegten Ratschläge nicht eingehen wollten. Er verließ verärgert Pittsburg und arbeitete wieder allein weiter. Westinghouse war mittlerweile durch Finanzmanöver der Gegner in große finanzielle Schwierigkeiten geraten. Vertragsgemäß hätte Westinghouse an Tesla Lizenzgebühren in der Höhe von ca. 12 Millionen Dollar zahlen müssen, was ihm in der damaligen Situation unmöglich war. Tesla jedoch verzichtete in dankbarer Erinnerung daran, daß Westinghouse der einzige war, der ihn richtig erkannt hatte und der dem Wechselstromsystem die Bahn eröffnete, mit großzügiger, nobler Geste auf die Zahlung der 12 Millionen Dollar und auf jede weitere Zahlung von Lizenzgebühren. Diese Tat findet nicht ihresgleichen in der Geschichte. Für Tesla sank somit die Hoffnung, von Geldsorgen verschont zu sein. Denn die seinerzeitige Million blieb ihm auch nicht, da er die Hälfte an seine Finanziers, u. a. A. K. Brown, refundieren mußte.

Von neuem begann Tesla seine wissenschaftliche Tätigkeit. Wieder rührte sich Erfahrung an Erfahrung. Er widmete sich jetzt der Hochfrequenztechnik. Bei seinen Forschungen auf dem Gebiete des Drehstromes war es ihm gelungen, Frequenzen von 10 000 Hz zu erzeugen; er erkannte sofort, daß er hier ein Gebiet betrete, das zu großen Erfolgen führen werde. Er entwickelte die eisernen Transformatoren für diese hohen Frequenzen, da er den schädlichen Einfluß des damaligen Eisens in den

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Transformatoren für hohe Frequenzen erkannte. Er baute auch Öltransformatoren und legte damit den Grund für die heutige Entwicklung der Hochspannungstransformatoren, wie sie beispielsweise den Bau kleiner Hochspannungsgräfes für transportable Röntgenapparate ermöglichen, bei denen sich innerhalb eines geerdeten, mit Öl gefüllten Behälters der Hochspannungstransformator und die Röntgenröhre befinden. Tesla machte bereits den Vorschlag, Uhrenwerke mittels konstanter Frequenz als Synchronuhren zu betreiben. Er beschäftigte sich mit dem Prinzip der Resonanz in Wechselstromkreisen und dehnte seine Versuche von der Niedrfrequenz auf die Hochfrequenz aus. Er konstruierte die berühmten gewundenen Tesla-Spulen, die noch immer im Physikunterricht die Schüler begeistern. Bereits 1890 hatte er die Wirkung der Hochfrequenzströme entdeckt, und wenn heute mit Diathermie behandelt wird, so hat Tesla auch dazu schon den Grund gelegt. Teslas Vorträge zählten zu den interessantesten Erlebnissen für die Fachwelt: seine experimentelle Geschicklichkeit, seine kühnen Gedanken ließen die Zuhörer immer neue Sensationen erleben. Immer boten seine Vorlesungen Neues. In New York, in London, in Paris, überall größte Erfolge. Im Jahre 1893 durfte er erleben, daß die Weltausstellung, die aus Anlaß der 400. Wiederkehr des Jahrestages der Entdeckung Amerikas veranstaltet wurde, mit Wechselstrom nach dem Teslaysystem versorgt wurde. Der Wechselstrom hatte den Sieg

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davongetragen. Eine Auswirkung dieses Erfolges zeigte sich im Niagarafall-Projekt, des größten damaligen Elektrizitätswerkes, das eine Mehrphasen-Wechselstromanlage erhielt. Was Michael Faraday im Jahr 1831 entdeckte, war durch die Arbeiten des kongenialen Tesla zur höchsten Vollendung gebracht worden.

Daß es bei all diesen Erfolgen nicht an Neidern und solchen, die den Ruhm Teslas schmälen wollten, fehlte, ist selbstverständlich. Schließlich aber mußte man doch der Wahrheit die Ehre geben und anerkannte Tesla als den umstrittenen Erfinder des Mehrphasensystems. 1897 erschien in der Zeitschrift „Electrical Review“ ein Interview mit Tesla, in dem er in großen Zügen seine radiotechnischen Entdeckungen darlegte. 1892 hatte er schon die Detektorröhre für seine Radiosetzung in Verwendung gebracht. 1893 bis 1898 erwarb er grundlegende Patente auf dem Gebiete der Hochfrequenztechnik. Der Plan des Weltwundfuns beschäftigte ihn längst. Seine reiche Sammlung radiotechnischer, von ihm erfundener Apparate verursachte ein Brand im Jahre 1895 mit sämtlichen Plänen. 1898 war er bereits wieder so weit, daß er ein Schiff drahtlos steuern konnte. 1899 begann er mit seinem größten Werk, mit der Errichtung der 200 kW Radiostation in Colorado. Die Vorversuche hatten bereits beste Erfolge gezeigt und gaben zu großen Hoffnungen Anlaß. Doch dieses so geniale Werk krankte an Geldmangel und wurde nie fertiggestellt. Tesla hätte eben immer

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Millionen zur Verfügung haben müssen, dann wären Milliarden daraus geworden. Was wir heute als neu bewundern, ob es das Prinzip des Elektronenmikroskopes ist, ob es stärkste Röntgenstrahlen sind oder die Leuchttstofflampen, die kosmische Strahlung, künstliche Radioaktivität, Todesstrahlen, alles hat Tesla bereits erprobt und zumindestens vorausgesagt.

Vielelleicht wird viel Neues uns noch eröffnet werden, wenn anlässlich des im nächsten Jahre stattfindenden Tesla-Kongresses bisher noch nicht veröffentlichtes der Allgemeinheit bekannt werden wird.

Was ich hier heute über Tesla zu seiner Würdigung vorbringen durfte, war nur wenig, und dies auch nur in ganz großen Zügen, so daß ich keinen Anspruch darauf erheben darf, Tesla so gewürdigt zu haben, wie er es verdient. So wie ihm auch zeit seines Lebens nie die Ehre zuteil geworden war, die ihm gebührt hätte, da er in seiner Bescheidenheit der Technik und nicht seiner Person zuliebe tätig war.

Möge diese Feier und der Kongress im nächsten Jahre dazu beitragen, dieses einzigartige Genie im rechten Lichte erscheinen zu lassen.



Büste Nikola Tesla

modelliert von Prof. Ivan Mestrovic, gegossen in der Gießereiwerkstätte der Zagreber Akademie. Dem Technischen Museum in Wien gewidmet von der jugoslawischen Regierung

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Ehrenurkunde des Technischen Museums in Wien
für den Geburtsort Nikola Tesla

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Deutsche Übersetzung
der vorstehenden Urkunde

Dem unbekannten Bergdorf Smiljan entsproß der
geniale Erfinder

NIKOLA TESLA

der die Kenntnis und Beherrschung des elektrischen
Stromes mächtig förderte und ihn auch der mensch-
lichen Gesundheit dienstbar machte. Er war ein
Gelehrter und Patriot, Weltbürger und Wohltäter,
weit voran seiner Zeit im kühnen Flug des Geistes.
Mit Stolz und Ehrfurcht gedenken wir des unsterb-
lichen Mannes und danken dem Kästeldorf, das ihn
gebar als leuchtendes Vorbild edelsten Menschentums.

Technisches Museum
für Industrie und Gewerbe

Wien, 23. Juni 1952

Rede Sr. Magnificenz Dr. R. Eigenberger,
anlässlich der Verleihung der Ehrenmitgliedschaft der
Akademie der bildenden Künste Wien an Ivan
Mestrovic am 14. Dezember 1951. (Gekürzter
Text.)

Vor fünfzig Jahren war es gewesen, als der junge
Ivan Mestrovic in die Büchauer-Schule von
Professor Edmund Hellmer an unserer Akademie
aufgenommen wurde.

Der Überlieferung nach war sein Großvater das
erste Oberhaupt der Familie gewesen, das nicht um
die Freiheit des Lebens, das Leben hatte opfern
müssen. Eisengraue Berge und Felsen über die raue
Winde streichen, in Tälern und Mulden das gedrückte
Grün von dürtigem Bauern- und Weideland, und
über allem der Himmel des Südens – das ist die
Natur, die seine Kindheit umgeben hat. In ihr hat
er mit der sehnslängigen Neugier seiner jungen Jahre
Schaf- und Ziegenherden gehütet und von der Welt
und ihren Dingen geträumt. Hier hat er mit der
tiefen Religiosität der Menschen, die diese harte
Ende trägt, seine Seele gefüllt. Sein Vater, ein Land-

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arbeiter und Maurer, der aber auch in den Formen ländlicher Kunstfertigkeit geübt. Möbel tischlerte oder steinerne Grabkreuze meistehte, war ihm der erste Erwachsene geworden für das, was in seinem kindlichen Herzen nach Gestaltung verlangte. Neben seinem arbeitenden Vater sitzend oder allein drinnen bei seiner Herde, suchte er Geschauten mit seinem Schnitzmesser nachzubilden. Und während er die Gesänge seiner Heimat von Kampf, Schausucht und Tod sang, stieg eigenes junges Dichten in ihm auf, das er in die uralten Weisen seines Volkes versenkte. Mit 15 Jahren brachte ihn sein Vater zu dem Steinmetzen Bilinic nach Split, der heute noch als Neunzigjähriger am Leben ist, und Kunde erhielt von der Feier, die heute in Wien seinem einstigen Lehrling zu Ehren begangen wird. Hier schaute er zum ersten Mal in die blaue Weite des Meeres, das seine Heimat säumt, und hier suchte er die Weite seines Inneren mit Dingen des Wissens und der Bildung zu füllen. Im Hause eines Schulmeisters hatte er Unterkunft gefunden. Nach rastloser Tagesarbeit saß er hier bis tief in die Nacht hinein über Büchern und Arbeiten, die diese kleine Welt ihm geben konnte. Hier erlebte er manche Anerkennung seiner frühen Begabung, aber auch die ersten Leiden der Enttäuschung.

Mögen es auch glückliche Zufälle gewesen sein, die es dem 16jährigen ermöglicht haben, schon nach einer einjährigen Lehrzeit und Tätigkeit als Bildhauer nach Wien zu kommen, so sind es doch

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ebenso die heißen Kräfte seines Herzens und seiner Begabung die schon so früh Alles in jene Bahnen zu zwängen wußten, die seiner Sendung als Künstler und Mensch Entfaltung und Aufstieg haben bringen können. Ohne eine andere Sprache, als die seines Volkes zu sprechen, war er nach Wien gekommen. Seine Günter und Freunde bemühten sich hier, ihm die Vorbildung zur Aufnahme an unserer Akademie zuteil werden zu lassen. Der Wiener Bildhauer König, der darum angegangen wurde, gab erst seine Bereitschaft hierzu, als er das verlangende, aus reichen Tiefen des Inneren kommende Brennen in den Augen des Jünglings sah. Dann kam die Schulung bei Hellmer an unserer Akademie, die im Grunde nicht mehr sein konnte, als die klare Heraufführung seines Ichs an die Weisheiten seines Talentes. Wenn er dann auch noch, trotz seiner immer eigenwilliger hervorbrechenden künstlerischen Kräfte, sich einer Ausbildung bei Professor Bitterlich unterzogen hat, so scheint er damit freiwillig eine Beengung auf sich genommen zu haben, die ihn nur noch mehr zu sich selbst hatte bringen können.

Schon am Ende des zweiten Jahres seiner Schulzeit bei Hellmer stellte er Werke seiner Hand in der Sezession aus. Sie brachten ihm die Zustimmung der Künstlerschaft, aber keinen Verdienst. Mit Neben- und Kopistenarbeiten erwarb er sich über karge Unterstützungen durch seine Landsleute hinaus die zum Leben und eigenem Schaffen notwendigen Mittel, bis er endlich im fünften Jahre seines Wiener

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Aufenthaltes in dem Wiener Kunstmuseum Wittgenstein einen Mäzen hatte finden können.

Sein Weg führte ihn nach Paris, wo er in der Kunst eines Rodin, Bourdelle und Maillol der Ausweitung seiner eigenen künstlerischen Persönlichkeit suchte. Dort gewann er als Künstler und Mensch die Freundschaft Rodins, der es öfter ausprach: Mestrovic est le plus grand phénomène parmi les sculpteurs. Daß er dort mitten im Zentrum der französischen Kunst in die gerade damals so übermächtig stark, weil am letzten Tiefen der künstlerischen Weltkatastrophe des aufstrebenden 20. Jahrhunderts kommende, die Räume Europas durchschattete, so ganz zum Künstler seines Volkes wurde, gibt Zeugnis von der inneren Geschlossenheit seines Wesens, das so tief seiner Heimat und seinem Volke verbunden ist.

Nach einem zweijährigen Pariser Aufenthalt folgte 1910 eine Kollektivausstellung seiner Werke in der Sezession in Wien, die dem Meister einen großartigen Erfolg einbrachte.

Im Pavillon, den der serbische Staat errichtet hatte, wurden in Rom im Jahre 1911 die Werke Mestrovic zum künstlerischen und nationalen Mittelpunkt.

Nach dem Abschluß des ersten Weltkrieges wurde Mestrovic Professor und 1922 Rektor an der Akademie in Zagreb, nachdem er politische Karrieren beiseite geschoben hatte, um weiterhin nur Künstler und einfacher Mensch sein zu können. Die ungelge

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Zeit des letzten Krieges brachte auch ihm schweres Leid und hartes Los. Zum zweiten Mal mußte er seine heiligste Heimat verlieren, diesmal schließlich in den Vereinigten Staaten von Nordamerika, einer Schaffensstätte in der Universität Syracuse zu finden.

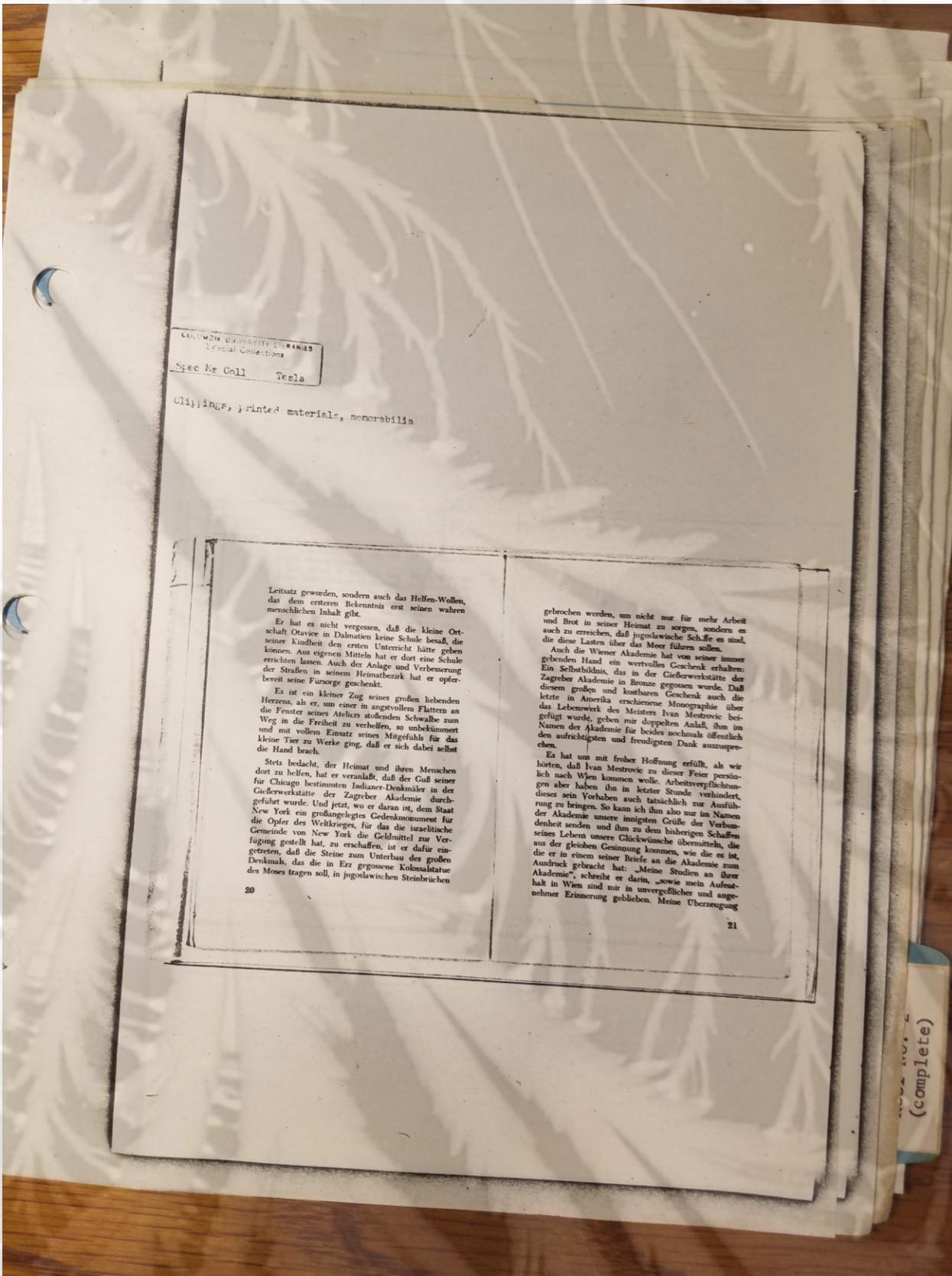
Was Mestrovic als Künstler für die Welt bedeutender war hat die Welt selber ihr Urteil gesprochen. Die Wiener Akademie hat mit der Verleihung der Ehrenbürgerschaft an Ivan Mestrovic nicht nur ihrem Stolz Ausdruck verleihen wollen, daß er als Schüler unserer Anstalt in seiner Kunst den Weg zu Größe und Ruhm angegangen hat und Wien es gewesen war, wo ihm die erste, große Anerkennung seines Schaffens zuteil geworden ist; sondern daß sie auch von Bewunderung erfüllt ist für die sehrem menschlichen Werte, die in seiner Persönlichkeit zu zwingender Größe vereinigt, vor uns stehen.

Von dem brennenden Pulschlag seines künstlerischen Herzens, den ihn zu Erfolg zu Erfolg getragen hat, sein menschliches Herz rein und unbefürcht in seelisch-schlichten, tiefen Einfachheit geblieben. Sein Glaube an die Menschen und die Welt, die so oft seinem nach Großen und Idealen durstenden Geiste böse Wunden geschlagen haben, blieb mitleidvoll und stark. Aus solcher Glaubenstiefe konnte er einen Optimismus bewahren, der ihn für eine während des Krieges in der Schweiz erschienene Schrift den Titel wählten ließ: „Und dennoch wollen wir hoffen.“

Aber nicht nur das Hoffen-Wollen ist ihm zum

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und mein Gefühl sagt mir, daß wir alle eine kulturelle Einheit bilden.“
Nun obliegt es mir nur noch Ihnen, sehr verehrter Herr Professor Dr. Abramic, der Sie als Landsmann und alter Freund des Meisters Ivan Mestrovic von ihm beauftragt wurden, an seiner Stelle die Urkunde der Verleihung der Ehrenmitgliedschaft unserer Akademie in Empfang zu nehmen, dieselbe zu übergeben.



Ivan Mestrovic

Professor an der Syracuse University, USA,
Ehrenmitglied der Akademie der bildenden Künste
in Wien, Schöpfer der Nikola Tesla-Büste im
Technischen Museum in Wien

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Deutsche Übersetzung
der vorstehenden Urkunde

Das arme Bergdorf Otavice schenkte der Menschheit

IVAN MESTROVIC

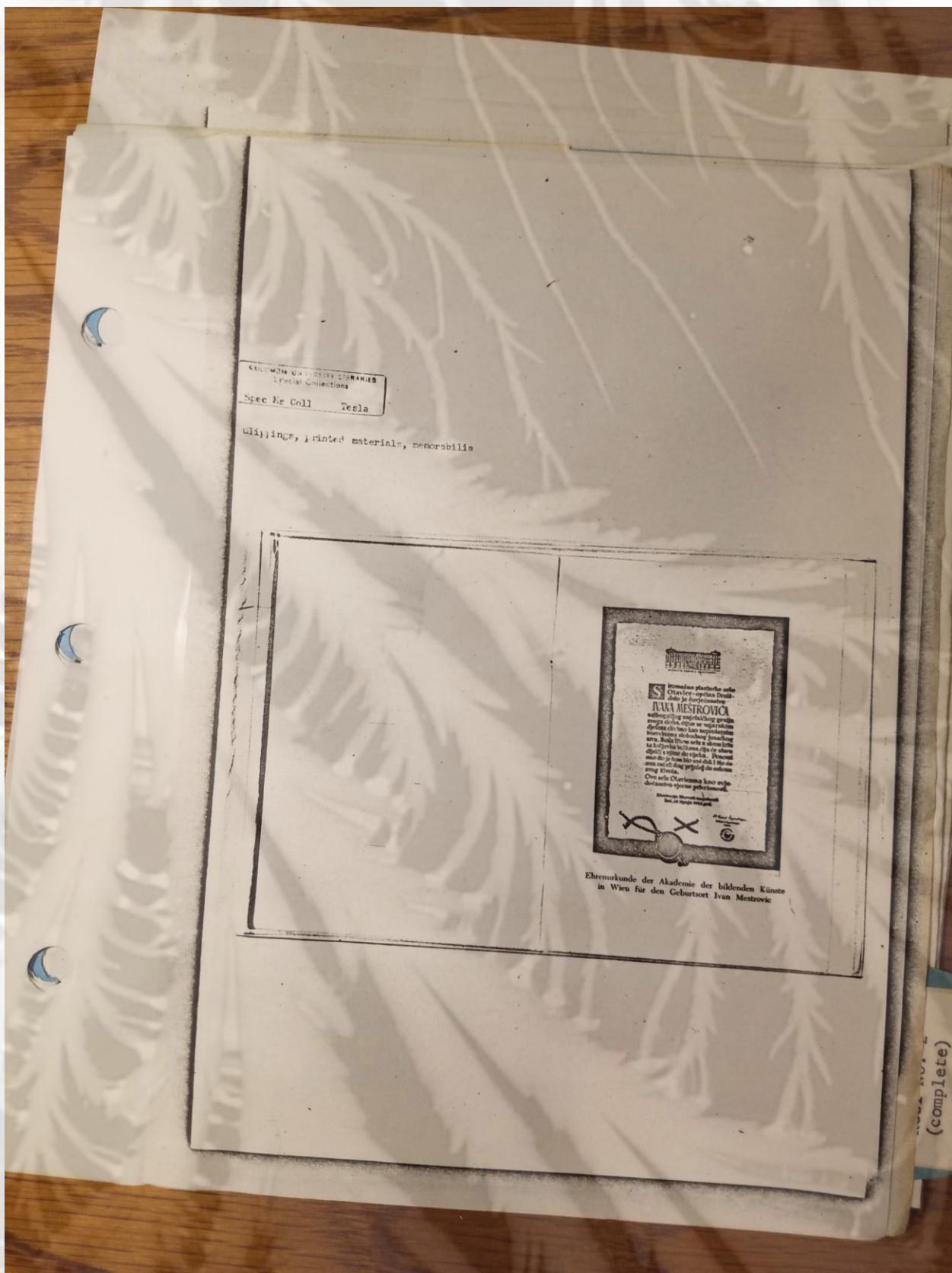
den reichsten Künstlergenius seiner Zeit, dessen Bildwerke wir bewundern als unvergängliche Schöpfungen eines freien Heldenherzens. Dank sei dem stillen Dorf im grauen Karst für die Wiege des Großen, dessen Raum es immer mit ihm teilen wird. Wir sind stolz, daß Ivan unser Schüler war und ein lieber Freund uns bleibt und wird bis an seinen Lebensabend.

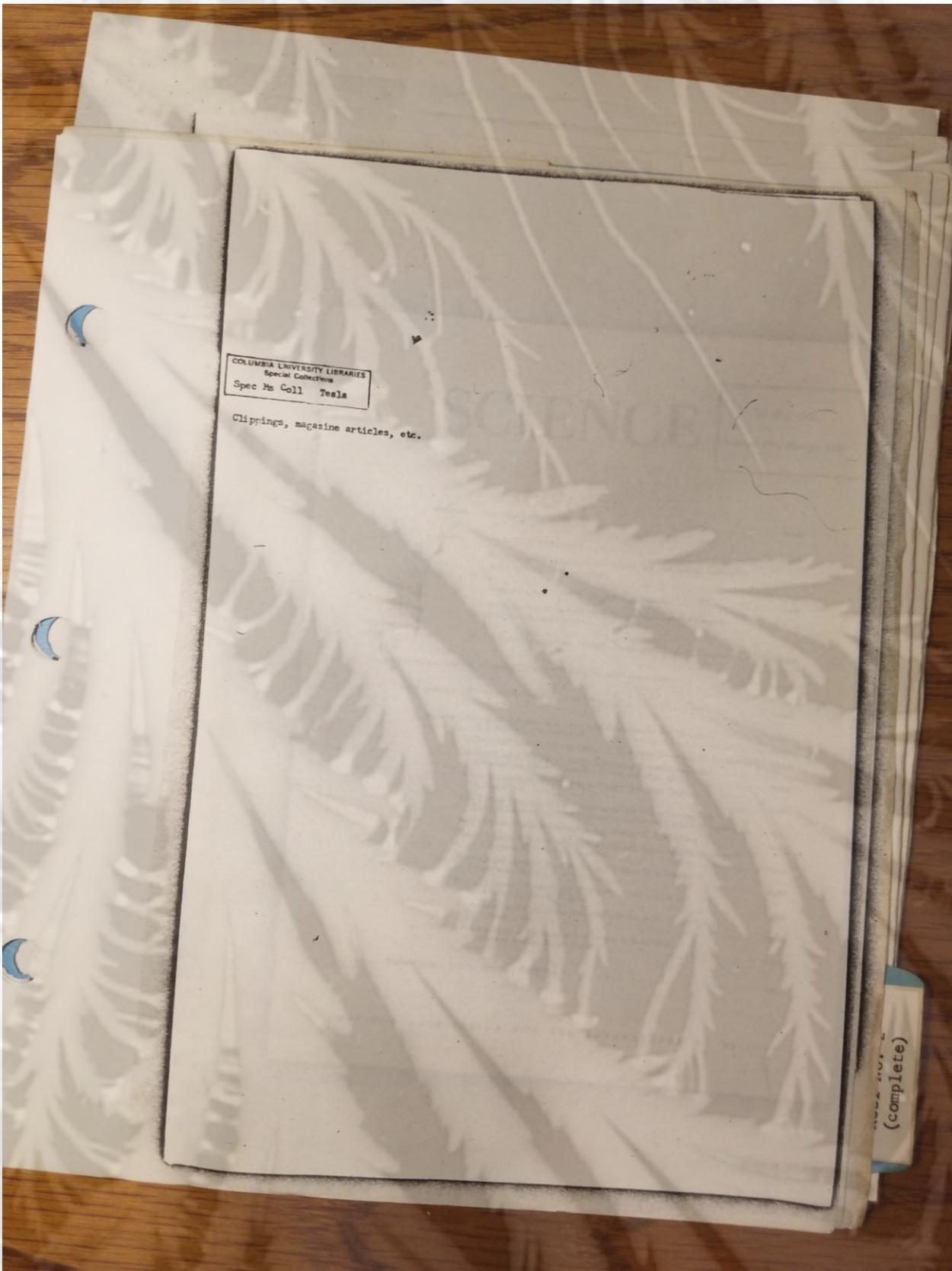
Dies dem Dorfe Otavice (Gemeinde Draž) als Zeugnis treuer Verbundenheit.

Akademie der bildenden Künste

Wein, 29. Juni 1932

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SCIENCE

16 May 1958

Volume 127, Number 3307

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16 May 1958, Volume 127, Number 3307

SCIENCE

Assures e

Nikola Tesla
Electricity today is generated, transmitted, and converted to mechanical power by means of his inventions.

Kenneth M. Swezey

At the stroke of midnight between the 9th and 10th of July, 1856, a son, Nikola, was born by candlelight to the Rev. Milutin and Djouka Tesla, in the tiny village of Smiljan, Lika, now part of Yugoslavia (Fig. 1). The child's father was pastor of the local Serbian Orthodox church; his mother, though an accomplished needleworker and inventor of household devices, could neither read nor write. From this humble and seemingly unpropitious beginning, Nikola Tesla, driven by some strange, compulsive genius, grew to become a discoverer and inventor whose contributions were, within his lifetime, to change the life and industry of the whole world.

Mention any of today's applications of electricity—and even some not yet fully developed—and the chances are good that Tesla had a hand in their concept and early development. In an incredible flight of achievement, beginning in the early 1880's and racing on for more than two decades, Tesla made basic discoveries and inventions in radio, the wireless control of boats and torpedoes, high-frequency induction heating, electrotherapeutics, gaseous tube and fluorescent lighting, electric clocks, x-ray equipment and techniques, and even rudimentary electric "brains." Before Marconi had flashed his first feeble "S" across the Atlantic, Tesla had already announced plans for a "World Wire-

less" system which would not only include point-to-point communication but the broadcasting of speech, music, time, and pictures. Tesla's induction motor and related polyphase system for the generation, transmission, and utilization of electric power made possible the first harnessing of Niagara Falls and laid the foundations for the whole modern electric power industry.

Tesla Centennial Celebrations

On 10 July 1956—the 100th anniversary of Nikola Tesla's birth—scientists and engineers from all over the world met in Belgrade, Yugoslavia, to pay homage to the memory of this great pathfinder. Convoked under the auspices of the National Yugoslav Tesla Committee, the Society for the Promotion and Advancement of Science and Technology, "Nikola Tesla," and the Nikola Tesla Museum (Fig. 2) of Belgrade, this celebration marked the beginning of a year of commemorative programs in Europe and America.

Niels Bohr of Denmark, Sir Arthur Fleming of England, Fredrik Dahlgren of Sweden, and Carl C. Chambers of the United States were among the more than a hundred distinguished guests. Richard C. Sogge, delegate of the American Institute of Electrical Engineers, presented a citation to the Tesla Committee from that institute. President Dunseath of the International Electrotechnical Commission brought word that

Mr. Swezey, a science and engineering writer who resides at 163 Milton Street, Brooklyn, N.Y., was a close personal friend of Tesla.

16 MAY 1958

the commission, at its meeting in Munich, 29 June–7 July, had recognized Tesla's fundamental contributions in the field of electricity by adopting the name "Tesla" for the unit of magnetic flux density in the meter-kilogram-second or Giorgi system.

Although Tesla was born a Serb, he came to America in his late twenties and soon became one of our greatest Americans-by-adoption. Among the American celebrations of his centennial, one of the most important was that of the American Institute of Electrical Engineers, which dedicated to Tesla its Fall General Meeting in Chicago, 1–5 Oct. 1956. Apparatus, photographs, and reminiscences were presented at this meeting, and Samuel G. Hibben, past president of the Illuminating Engineering Society, demonstrated how Tesla's gaseous-tube lighting experiments of the 1890's helped blaze the way for some of the latest developments of today in the field of lighting. Hibben repeated this demonstration on 15 May 1957 at a commemoration sponsored by the Franklin Institute of Philadelphia, where Tesla in 1893 had given one of his most famous lectures. Other memorials were arranged by the Institute of Radio Engineers and the Niagara Falls International Section of the American Institute of Electrical Engineers.

One of the chief objectives of these programs was to sift truth from legend and to set down, evaluate, and publicize some of the great concrete contributions Tesla has made to science and engineering.

Tesla's Greatest Contribution

To those who know of Tesla chiefly through association of his name with the "Tesla coil," it may come as a surprise to learn that his greatest contribution was not this popular device for making high-frequency, high-voltage demonstrations but his discovery of the rotating magnetic field and his brilliant adaptation of it to the induction motor and the polyphase system for the generation, transmission, distribution, and use of

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- Moveable carrier holding two polarimeter tubes, facilitates procedure of examination.
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- Interchangeable built-in sodium or mercury spectral bulbs furnish strictly monochromatic light controlled by precision interference filters.
- Newly-designed, precision polarimeter tubes ensure the absence of strain, further assurance of true measuring results.

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Nikola Tesla

Electricity today is generated, transmitted, and converted to mechanical power by means of his inventions

Kenneth M. Sauer

At the stroke of midnight between the 3rd and 4th of July, 1856, a tiny, Rev. Milutin and Djordje Tesla, in the tiny village of Smiljan, Lika, near part of Yugoslavia (Fig. 1). The child's father was pastor of the local Serbian Orthodox church; his mother, though an accomplished needleworker and inventress of household devices, could neither read nor write. From this humble and seemingly unpromising beginning, Nikola Tesla, driven by some strange, compulsive genius, grew to become a discoverer and inventor whose contributions were, within his lifetime, to change the life and industry of the whole world.

Mention any of today's applications of electricity—and even some not yet fully developed—and the chances are good that Tesla had a hand in their concept and early development. In an incredible flight of achievement, beginning in the early 1880's and racing on for more than two decades, Tesla made basic discoveries and inventions in radio, the wireless control of boats and aeroplanes, high-frequency induction heating, electrotherapeutics, gaseous tube and fluorescent lighting, electric clocks, x-ray equipment and techniques, and even rudimentary electric "brains." Before Marconi had flashed his first feeble "S" across the Atlantic, Tesla had already announced plans for a "World Wire"

line" system which would include power-generating rooms, the broadcasting of speech and pictures. Tesla's radio and related polyphase circuit, transmission, and electric power made possible the coming of Niagara Falls foundations for the modern power industry.

Tesla Congressional Commemoration

On 11 July 1956—the 100th anniversary of Nikola Tesla's birth and engineers from all over came to Belgrade, Yugoslavia, to pay homage to the memory of a pioneer. Sponsored under the aegis of the National Yugoslav Society, the Society for the Advancement of Science and Technology, "Nikola Tesla," at Tesla Museum (Fig. 2), the celebration marked the 100th year of communications in Europe and America.

Nick Isle of Denmark Fleming of England, Fred of Sweden, and Carl C. of the United States were among more than a hundred distinguished guests. Richard C. Seeger, director of the Institute of Electronics and Electrical Engineers from that institution, Dumbarton of the International Technical Commission, honored

Mr. Sauer, a science and engineering writer who resides at 163 Milton Street, Brooklyn, N.Y., was a close personal friend of Tesla.

18 MAY 1958

16 May 1958, Volume 127, Number 3307

SCIENCE

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Mr. Everett, a scientist and engineer, who resides in 101 Madison Street, Brooklyn, N.Y., was a student of Nikola Tesla's.

16 MAY 1958

Nikola Tesla

Electricity today is generated, transmitted, and converted to mechanical power by means of his inventions.

Kenneth M. Swezey

At the stroke of midnight between the 9th and 10th of July, 1856, a son, Rev. Marinus and Djordje Tesla, in the tiny village of Smiljan, Lika, the part of Croatia where Tesla was born, his father was passed by the local Serbian Orthodox church as a member, though an accomplished agriculturist and inventor of household devices, could neither read nor write. From this humble and seemingly insignificant beginning, Nikola Tesla, driven by some strange, compulsion-prone, pre-to-become-discoverer and inventor whose contributions were well-nigh infinite, to change the life and destiny of the world would ensue.

Menition any one of the applications of electricity, and even some not yet fully developed—and the chances are good that Tesla had a hand in their conception and development. In an incredible flight of achievement, starting in the early 1880's and racing on for more than two decades, Tesla made basic discoveries and inventions in radio, the wireless control of boats and torpedoes, high-tension alternating current, electrical transmitters, power lines and fluorescent lighting, electric clocks, X-ray equipment and techniques, and even rudimentary electric "television." Before Marconi had flashed his first signal across the Atlantic, Tesla had already announced plans for a "World Wire"

"Wireless" system which would no doubt make possible the instantaneous transmission of speech, music, time, and pictures over the induction motor and related polyphase systems he had invented. Tesla made possible the first functioning of Niagara Falls and laid the foundations for the whole modern electric power industry.

Tesla Centennial Celebrations

On 10 July 1956—the 100th anniversary of Nikola Tesla's birth—scientists and engineers from all over the world gathered in Belgrade, Yugoslavia, to pay homage to the memory of this great scientific genius and under the auspices of the National Yugoslav Tesla Committee, the Society for the Progress and Advancement of Science and Technology "Nikola Tesla," and the Nikola Tesla Museum, Belgrade, this celebration marked the beginning of a year of commemorative programs in Europe and America.

With Bohumil Dostál, Sir Arthur Fleming of England, Fredrik Dahlberg of Sweden, and Carl C. Chamberlain of the United States were among the more than a hundred distinguished guests. Robert C. Seeger, director of the American Institute of Electrical Engineers, presented a citation to the Tesla Committee from that institute. President Dunleath of the International Electrotechnical Commission brought word that

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Although Tesla was born a Serb, he came to America in 1884, and there he soon became one of our greatest American inventors. Among the American celebrations of his centennial, one of the most important was that of the American Institute of Electrical Engineers, which dedicated a plaque to Tesla in Fall General Meeting in Chicago, 2 Oct. 1956.

Apparatus, photographs, and manuscripts were presented at this meeting, and Sverdrup, then past president of the Illuminating Engineers Society, highlighted the importance of the 100th anniversary of Tesla's gamma-ray discovery. Hiltner helped the world to realize the latent developments of today in our age of lighting. Hiltner repeated this demonstration on 20 July 1957 at a commemoration sponsored by the American Institute of Philadelphia, where Tesla in 1893 had given one of his most famous lectures.

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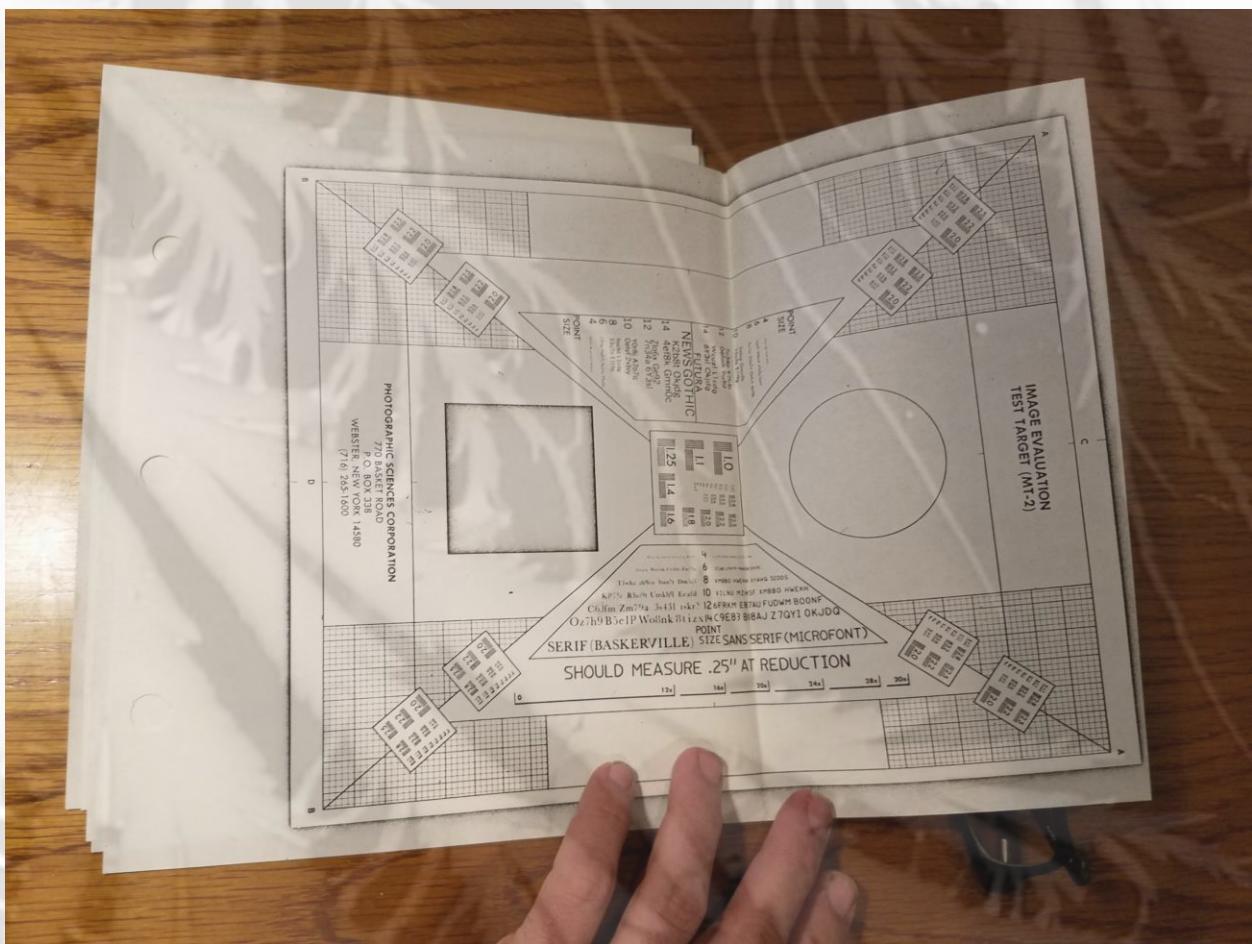
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TITLE: PHOTOGRAPHS,

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TESLA, Nikola, 1856-1943
Correspondence, manuscripts, documents, photographs and printed material,
1894 - 1936.

BOX I Cataloged correspondence: Nikola Tesla to Robert U. Johnson and family, 1894-1900 and n.d.

BOX II Nikola Tesla to Robert U. Johnson and family, 1901-1936; miscellaneous correspondence

BOX III Uncataloged materials: photographs, clippings, memorabilia, printed

BOX IV Cataloged correspondence: Letters to Nikola Tesla and George Scherff; Nikola Tesla to George Scherff, 1900- 8 July 1905.

BOX V Nikola Tesla to George Scherff, 10 July 1905- 1930.

BOX VI Cataloged manuscripts and documents; uncataloged printed material and photographs.

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NICOLA TESLA PAPERS

BOX III

CONTINUATION

CONTINUED FROM
REEL **3840**

46, E. Houston St.,

New York City, April 13th, 1895

Mr. Albert Schmid,
Pittsburgh, Pa.

My dear Mr. Schmid:-

I have just written to the Westinghouse Company about three small direct-current motors, viz., one H.P., one-half H.P. and one-quarter H.P., all to be wound for 220 volts.

Please oblige me and let me have these at once, as I need them temporarily in the shop, where I have at present only the direct current from the central station.

Sincerely yours,



Anderson, Leland - Anderson
N 1841
1855

AND MANUFACTURING CO. (REEL 7227) MIKOŁEJ TESLA
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241

MSS 481

46, E. Houston St.,

New York City, April 25th, 1895.

Mr. C. F. Scott,
Pittsburgh, Pa.

My dear Mr. Scott:-

I have written to the Westinghouse Company about a high-tension converter of a somewhat modified design, which is intended to replace the old converters constructed for the World's Fair.

Although I know that Mr. Schmid will do for me as much as he can, yet fearing that he may be too busy, or away from the factory, I write this to ask you if you would not kindly devote a little attention to this small matter. I shall be very much obliged to you if you will see that I get at least one of the two converters very soon. I hope also that you may be able to advance the construction of the rotating transformer which I have ordered some time ago. My work has been suddenly interrupted just as I was at the most interesting stage of the development of certain ideas, and I need very much my apparatus to begin work anew.

Thanking you in advance for any service in this connection,

I am

Sincerely yours,

O
285
300-15
MOZEX
Nikola Tesla

AND MANUFACTURING CO. (R.R. 4221) Nikola Tesla
folded 19

46, E. Houston St.,

New York City, April 26, 1895.

247.

Mr. Albert Schmid,
Pittsburgh, Pa.

My dear Mr. Schmid:-

Your dispatch of yesterday received.

Please accept my thanks for the prompt action. I hope that
the construction of the rotating transformer is favorably progress-
ing.

Yours sincerely,

32

285.

MSS
481

46, E. Houston St.,

New York City, May 4th, 1895.

Mr. C. F. Scott,
Pittsburgh, Pa.

241
310-15
310-54~



My dear Mr. Scott:-

Thanks for your letter of May 3rd, which I have just received.

I hardly need to assure you again, on this occasion, that I shall be much obliged for any trouble you take in advancing the work on my apparatus.

I am particularly anxious about the rotating transformer, as I have not heard anything since some time in regard to it.

Yours very truly,

35

46, E. Houston St.,

New York City, May 1st, 1895.

Mr. Albert Schmid,

Westinghouse Electric Co.,

Pittsburgh, Pa.

My dear Mr. Schmid:-

Your dispatch just received. I am much
obliged for your kindness, and hope that there will be no unforeseen
delay in the shipment.

Yours sincerely,

46, E. Houston St.,

New York City, May 22nd 1895.

Mr. Albert Schmid,

Westinghouse Electric Co.,

Pittsburgh, Pa.

My dear Mr. Schmid:-

Please mail, as soon as possible, upon receipt of this letter, the blue-prints of the rotating-field transformer, as I want the dimensions of the base.

Oblige me by an answer without delay.

Sincerely yours,

352,



45

46, E. Houston St.,

New York City, May 28th, 1898.

Mr. Albert Schmid, Sup't.,

Westinghouse Electric Co.,
Pittsburgh, Pa.

My dear Mr. Schmid:-

Thanks for blue-print of the foundation
for my rotating transformer which I have just received together
with your letter of May 24th.

I hope that you will be able to ship the machine, as promised
in your last letter. I also anticipate the shipment of the high-
tension transformer very shortly.

With thanks for your kindness, I am

Sincerely yours,

46, E. Houston St.,

New York City, June 10th, 1895.

Mr. Albert Schmid, Supt.,

Westinghouse Electric Co.,

Pittsburgh, Pa.

My dear Mr. Schmid:-

Your dispatch of Saturday has reached me
late in the afternoon. I thank you very much for the prompt at-
tention to my letter, and hope that the machine has turned out en-
tirely to your satisfaction, which means to say that it cannot be
further improved.

You will add to my obligations if you will inform me when you
expect to ship my high-tension coil. It must be very well under
way, judging from a letter which Mr. Scott wrote to me some time
ago. I hope also that you will be able to ship the starting-box
together with the rotating-transformer.

Hoping to have soon the pleasure of seeing you, I am

Sincerely yours,

Sincerely yours,

Thinking you in advance, I am
such as to make the shipment in this way very expensive.
express. I suppose that the weight of this apparatus will not be
to ship the regulating box as well as the high tension coil by
have shipped Monday last, presumably by freight, I would be glad to inform you
the invoice of the rotating transformer, which you informed me you
had not to this day, as yet, received

My dear Mr. Schmidt:-

प्रातिस्पर्धा, पा.

46, E. Houston St.,
3-31

398

Mr. Albert Schmid, Gen. Supt.,
Westinghouse Electric Co.,
Pittsburgh, Pa.

46, E. Houston St.

~~89 New York~~

-38-41

~~332~~ ~~3-7~~

CO.,

Pa.

My dear Mr. Schmid:-

I have run the motor yesterday, and was very much pleased to note the great improvements you have made in these machines over those of two or three years ago. I have no doubt that it is a highly efficient machine, judging from the quickness with which the speed regulation is effected. My idea was that you would ship a pulley together with the motor, as you do with generators. The most suitable size for me would be between 16 and 20 inches. I would like you would send on one which is very well balanced, of that size, or slightly larger.

Hoping to hear from you with return mail, I am

Sincerely yours,

55

J.P. MORGAN & CO.
Wall St Corner Broad.
New York.
DREXEL & CO.
Philadelphia.
MORGAN, HARRIS & CO.
Paris.

New York, February 15th, 1901 190

MS. A. 1. 1
181

Nikola Tesla, Esq.,

46 East Houston Street, New York.

My dear Mr. Tesla:-

I enclose draft of a letter which I think covers the arrangement you talked of with Mr. Morgan. If you will write him such a letter as this and send him at the same time assignments of the fifty-one per cent. interest in the various patents, he can confirm the understanding by letter and that will complete the arrangement. I have showed this to Mr. Morgan and he thinks it is allright.

Yours very truly,

Park Hale

MS. A. 1. 1
181
1901
Nikola Tesla Correspondence

23 WALL STREET

New York, Oct. 15th, 1904.

Mr. Nicola Tesla,
Waldorf-Astoria,
New York City.



Dear Sir:-

Referring to your letter of
13th October, Mr. J. P. Morgan wishes
me to inform you that it will be impos-
sible for him to do anything more in
the matter.

Yours truly,

C. W. Loring
Private Secretary.

23 WALL STREET

New York, Oct. 15th, 1904.



Mr. Nicola Tesla,
Waldorf-Astoria,
New York City.

Dear Sir:-

Referring to your letter of
13th October, Mr. J. P. Morgan wishes
me to inform you that it will be impos-
sible for him to do anything more in
the matter.

Yours truly,

C. W. Ting
Private Secretary.

A
Tesla
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slept
160



NIKOLA TESLA
"They said it
SEP 3 1960 NEW
come 700 inventions to his

7-15-33

Like the great Edison for whom he once worked as an electrical designer, Nikola Tesla sleeps little (ordinarily from 5:30 a. m. until about 10:30), he told visitors to his seventy-sixth birthday party in New York. Born in Serbia July 10, 1857, and still active, the "father of radio" declares that he was never in better health.

[Wide World.]

L 17
50

Chicago Daily News

ABERCROMBIE & FITCH CO.
MADISON AVE. AT 45th ST., NEW YORK 17, N. Y.

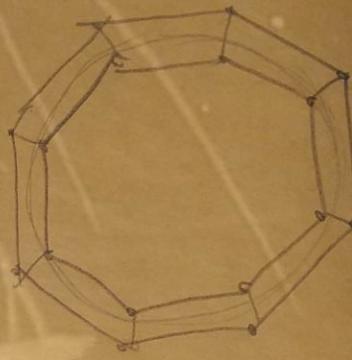


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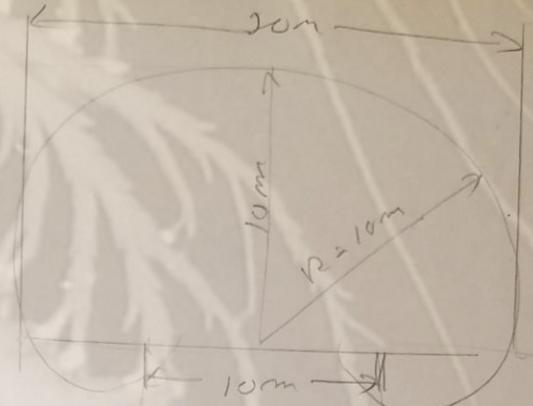
Form 3547 Requested

$\frac{2414}{2} = 1,15 \text{ m}$ $\frac{29}{2} = 12 \text{ m}$

$\frac{29}{2} = 14.5 \text{ m}$

STRUCTURE
OUTLINE

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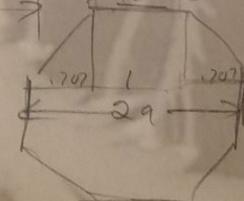


47 m

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filled
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actual

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1707
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$$\frac{10}{2.414} = 4.15 \text{ m}$$

$$\frac{29}{2.414} = 12 \text{ m}$$

18
23



Room 109.

90,245
Amendt A
Filed Apr. 15-1904.

Application of Nikola Tesla,
filed January 18th, 1902, Serial
No. 90,245, Apparatus for Trans-
mitting Electrical Energy Through
the Natural Media.

New York, April 14th, 1904.

Hon. Commissioner of Patents,

Sir:-

In the above entitled application we amend as fol-
lows in response to the official letter of April 16, 1903:

Cancel the entire specification and claims, except
the signatures, and substitute therefor the annexed.

Replying to the Examiner's statements in the official
letter mentioned we would say that the electrode a^2 of patent
689,096 is not supported on a place of low density, but to all
appearance on a place of high density, since the radius of
curvature of the support is very small in comparison with that
of the electrode. As pointed out, the arrangements described
in this and other references previously cited have nothing
whatever in common with applicant's invention. We have endeavored, on
pages 9, 10 and 11, of the new specification, to bring out the
salient features of his invention, which we trust will be
sufficient to convince the Examiner on this point.

The claims formerly rejected have been amended, and
additional ones introduced.

The changes required in the drawing will be made in
good season.

Respectfully submitted,

Kerr, Bagz & Cooper
5 371-16

April 3, 1895

ELECTRICAL REVIEW

Vol. 26—No. 1

of 21 NIKOLA TESLA'S LOST APPARATUS

ILLUSTRATIONS AND DESCRIPTIONS
OF SOME OF THE INVENTOR'S
DEVICES DESTROYED BY FIRE—
HIS GOOD FORTUNE IN HAVING
HAD PHOTOGRAPHS MADE OF
THIS APPARATUS MORE THAN A
YEAR AGO—THE "OSCILLATOR"
AND ITS WONDERFUL EFFI-
CIENCY.

Nikola Tesla some time since established his right to be known as the most promising electrical inventor of to-day. When on March 13 last his laboratory, his workshop and all its contents, and most of his important records were totally destroyed by fire, the loss was felt by every one familiar with recent electrical developments.

Tesla, although an extremely modest man, is very widely known through his achievements in pure

again the labor of years in the hope of reconstructing what had been totally wiped out. He is now busily engaged at this herculean task.

In view of the fact that Mr. Tesla's most important records were burned, it is extremely fortunate that the persuasions of Mr. Thomas Commerford Martin resulted in securing photographs of a number of pieces of apparatus which Mr. Tesla had developed and constructed more than a year ago. The illustrations which accompany this article were made from the photographs referred to. The half-tone plates were engraved at the time the photographs were taken, another fortunate circumstance, as the original prints were burned with everything else the Tesla laboratory contained.

Naturally, Mr. Tesla does not wish to have complete technical evidence

currents. His first public lecture was based on these discoveries.

Since Tesla's discovery of the "rotating magnetic field" the long-distance transmission of alternating current from Niagara Falls has become possible. The basic idea of this discovery is to produce a circularly shifting magnetism instead of the well-known phenomenon of magnetism in a fixed position.

To the lay mind the most wonderful of all Tesla's experiments was the lighting of electric lamps or empty glass bulbs in free space, without any connection with the wires or generating apparatus. The light from these Tesla tubes is so intense that photographs taken by their illumination have been made with exposures of eight to 10 minutes.



FIG. 1.—THE TESLA OSCILLATOR SHOWN AT CHICAGO IN 1893.

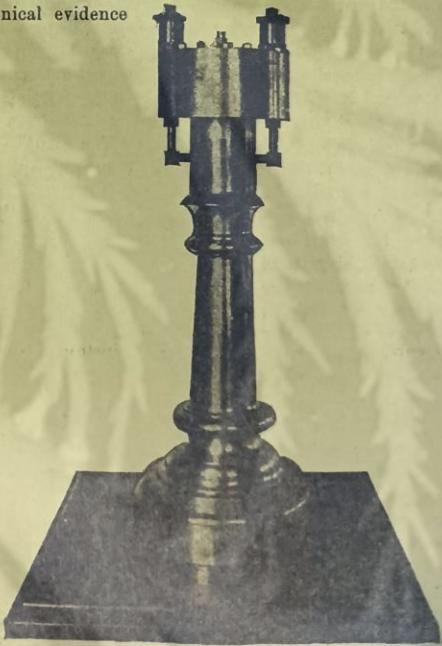


FIG. 2.—A SIMILAR FORM OF OSCILLATOR.

Electrical Review (N.Y.) April 3, 1895

* brake through his achievements in pure to have complete technical evidence

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FIG. 1.—THE TESLA OSCILLATOR SHOWN AT CHICAGO IN 1893.

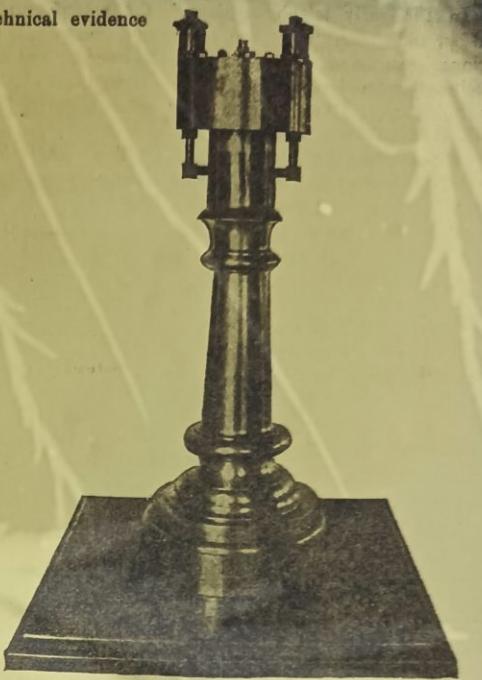


FIG. 2.—A SIMILAR FORM OF OSCILLATOR.

electrical science and through the of his work published abroad while many articles that have been written he is in his present crippled condition, yet it is by his permission that technical writers. The loss which he recently sustained was a most serious

one and called forth expressions of sympathy from every side. It resulted in his receiving one of the highest compliments ever paid to any man. This was from the pen of Charles A. Dana, editor of the New York *Sun*, and a warm admirer of Tesla. Mr. Dana wrote as follows:

The destruction of Nikola Tesla's workshop, with its wonderful contents, is something more than a private calamity. It is a misfortune to the whole world. It is not in any degree an exaggeration to say that the men living at this time who are more important to the human race than this young gentleman can be counted on the fingers of one hand; perhaps on the thumb of one hand.

Immediately following the fire Mr. Tesla, instead of being prostrated by his misfortune, as reported in several daily newspapers, secured new quarters in which he began all over

In the course of lectures, all too few in number, Mr. Tesla has at different times demonstrated before technical societies in this country and abroad a number of experiments wonderful in themselves and yet puny in comparison with the deep work of which they were but a feeble outgrowth. It has come to be pretty generally understood that the principal objects of Mr. Tesla's labors were the more efficient production of light, heat and power by electricity and the transmission of energy over long distances. His name is especially associated with the discovery of new phenomena resulting from his researches into the qualities and effects of high potential and high frequency

The wide field for improvement open to Mr. Tesla in his efforts to discover more efficient means of generating electrical energy may be better appreciated when it is stated that actual tests have shown that the energy manifesting itself as light in an incandescent lamp is less than five per cent of that received as current. The other 95 per cent is lost between the coal pile and the lamp. An important step in Mr. Tesla's labors to reduce this tremendous loss was the invention of his "oscillator." He reasoned that if large losses occurred in the steam engine and other large losses in the dynamo, it would minimize the combined losses if both machines were blended in one. And in the crudest terms this is what an oscillator is—an engine-dynamo.

In generating current by a revolving armature there is always some part of the wire winding which is doing no work, just as in the steam engine the steam cylinder and its

AN ELECTROLYTIC CLOCK.

BY

Nikola Tesla

If a delicately pivoted and well-balanced metal disc or cylinder be placed in a proper plating solution midway between the anode and cathode, one half of the disc becomes electro positive and the other half electro negative. Owing to this fact metal is deposited on one, and taken off from the other half, and the disc is caused to rotate under the action of gravity. As the amount of metal deposited and taken off is proportionate to the current strength, the speed of rotation, if it be small, is proportionate to the current.

The first device of this kind was operated by me early in 1888, in the endeavor to construct an electric meter. Upon learning, however, that I had been anticipated by others, as far as the principle is concerned, I devised the apparatus illustrated in the accompanying engraving. Here r is a rectangular frame of hard rubber which is fastened upon a wooden base. This frame is about $\frac{1}{2}$ inch thick, 6 inches long and 5 inches high. On both of its upright sides are fastened thick metal plates which serve as the electrodes. These plates are held firmly against the rubber frame by the binding posts r and r' . On the lateral sides of the frame are fastened the brass plates a and a' , respectively, of the same shape as the rubber frame r . These brass plates serve to keep in place two plates of

should then be so placed that it is exactly in the centre of the solution. By means of a horse-shoe magnet the disc may then be rotated and set in proper position.

The copper solution being carefully poured in, and the plug r replaced, the terminals of a constant current battery are connected to the binding-posts r and r' , and from time to time the rotation of the disc is observed. A shunt is connected to the other two binding-posts a and a' , and by varying the resistance of this shunt, or other disc, the speed of rotation is regulated until it is made to correspond to the division of the dial; that is, until, for instance, one turn is made in 12 hours.

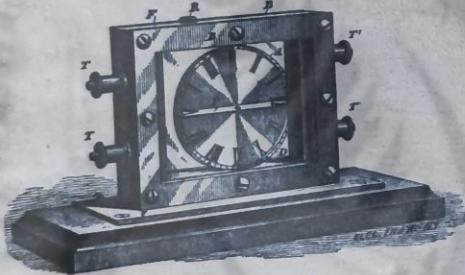
Obviously this instrument was not devised for a practical purpose. Neither will it be quite exact in its indications. There are certain errors, unavoidable from the principle; for instance, the friction, which cannot be completely overcome. But the device is interesting as a means of indicating time in a novel manner. It will, however, be found that by a careful construction, constant current, and a temperature compensator, it may be made to rotate with almost perfect uniformity. The current density should, of course, be very small to secure the best results, and the disc of about 3 inches diameter should turn once in 6 hours. It is probable that with a silver solution and a silver plate better results would be obtained.

It is very interesting to note the appearance of the solution and disc in such a narrow transparent vessel. The solution appears a clear blue, one side of the disc seems to be silver white in a certain position, and the other half is dark like tarnished silver. There is no line of demarcation, but the shades melt beautifully together.

OPERATING SUB-STATIONS BY THE MOTOR-DYNAMO SYSTEM IN BROOKLYN.

BY

W.H. Barstow



TESLA'S ELECTROLYTIC CLOCK.

polished glass, and the vessel is hermetically sealed by placing a soft rubber washer under and above each of the glass plates. In this manner the plates may be screwed on tight without fear of breaking them.

The plating solution, which in this case is a concentrated solution of sulphate of copper, is poured in through an opening on the top of the rubber frame, which is closed by a plug r .

In the center of the vessel is placed a light and delicately balanced copper disc n , the axis of which is supported by a capillary glass tube which is fixed to one of the glass plates by means of sealing wax, or other material not attacked by the liquid. To diminish the friction as much as possible, the capillary tube which serves as a bearing contains a drop of oil. The center of the disc should be equidistant from both the electrodes. To one side of the axis of the disc is fastened a very light indicator or pointer consisting preferably of a thin glass thread. The glass plate next to this pointer has a circle with the usual hour divisions engraved upon it, as on a clock dial. This circle may be movable so that it can be put in any position relatively to the disc.

THE Edison Electric Illuminating Company of Brooklyn, during the fall of 1890, resolved to extend their territory for furnishing low tension light and power, by the erection of a second district station. After a careful consideration of the matter, it was deemed best to supply this new territory from their present first district station until a sufficient load was accumulated to warrant the expenditure necessary for the erection and maintenance of the second district station. For this purpose a large feeder, consisting of copper conductors of 1,000,000 circ. mils each was laid underground to a point two miles distant from the present first district station. From this point sub-feeders were laid, and these in turn were heavily bridged by the net-work of mains. A standard feeder is selected from one of these sub-feeders, and at the extremity of this the voltage is kept at a constant pressure. As the load increases, the voltage is necessarily raised at the station end of the large feeder so as to preserve the voltage at the extremity of the sub-feeder. The efficiency of this system of low tension long distance transmission depends on the cost of the loss in the main feeder compared with the increased operating expenses of a second district station. When the cost of the loss (in watts) in this transmission equals the operating expenses of a second district plant, then this plant will be erected and will be run until the cost of operating exceeds the loss in transmitting from the first district station. It has been theoretically calculated (and since proved by practical results) that 1,000 amperes can be transmitted before the starting of the new station is

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Address.—Business letters should be addressed and drafts, checks and post-office orders made payable to the order of THE ELECTRICAL ENGINEER. Communications for the attention of the editors should be addressed, EDITOR OF THE ELECTRICAL ENGINEER, 150 Broadway, New York city.

Communications suitable for our columns will be welcomed from any quarter. Discussions of subjects relating to all branches of electro-technical work, by persons practically acquainted with them, are especially desired. Unavailable and rejected manuscripts will be returned only when accompanied by the necessary postage.

Advertisements.—We can entertain no proposition to publish anything for pay, or in consideration of advertising patronage, except in our advertising columns. Our editorial columns will express our own opinions only, and we shall present in other columns only such matter as we consider of interest or value to our readers.

VOL. XI.

NEW YORK, MAY 27, 1891.

No. 160.

Many valuable inventions have been founded on the discovery of simple facts, but such inventions can never be perfected unless the principles of science upon which they are based are known.—Joseph Henry.

THE TESLA EXPERIMENTS.

WHILE the interest in all the papers of the annual meeting of the American Institute of Electrical Engineers was sustained throughout the sessions, there can be no question that most interest centred upon the lecture delivered by Mr. Tesla on the phenomena of alternating currents of high frequency. Mr. Tesla's recent utterances on this subject had served to excite the curiosity of many, and we believe that a thorough analysis of the work accomplished by Mr. Tesla, as exhibited in the experiments shown by him, will lead to the conclusion that those expectations have been more than realized. The brilliant researches and experiments inaugurated by Dr. Hertz, and followed up by Lodge and others, which served to verify the theory that the phenomena of light were referable to electro-magnetic vibrations of the ether, seemed to point out an apparently easy way of obtaining illumination directly through the medium of electro-magnetic vibrations. It has remained for Mr. Tesla, however, to recognize that for the production of light, electrostatic effects are needed. He reasoned that it was impossible to obtain primarily the desired electro-magnetic effects, since we must work with bodies of infinitesimal dimensions which can be acted upon only electrostatically; it being evident that an electro-magnetic wave cannot excite luminous radiation unless it be a true light wave. To produce longer electro-magnetic waves would, therefore, be of no avail; but this is not the case with electrostatic waves or thrusts. These, no mat-

ters, causing the molecules or atoms to vibrate and to emit light; and since electrostatic effects are dependent upon the conjoint effects of potential and frequency, this reasoning led him to the investigations, the results of which were shown.

Continuing the train of reasoning followed by Mr. Tesla, we see that he has recognized further, that electrostatic effects of such character are available in many ways for the production of light. Thus he showed that if a filament in a globe be connected with only a single terminal of the source, in consequence of the rapidly alternating potential, the molecules of the gas are strongly attracted and repelled, and in this manner by their impact a filament may be kept at incandescence with only one wire. With these facts before him, and recognizing further that the employment of a filament is a bar to the attainment of higher efficiency on account of the limited degree of incandescence at which it can be run, Mr. Tesla reasoned that two blocks of a refractory material may be placed in a perfectly exhausted globe and sufficient energy transferred by condenser action to keep the blocks at incandescence, thus allowing a much higher efficiency in the production of light by reason of the possibility thus afforded of maintaining the carbons at a much higher degree of incandescence. Mr. Tesla has also shown that it is perfectly practicable to transfer sufficient energy to the medium, from a single block or filament placed in a perfectly exhausted globe and connected with one wire to the source, to keep the filament at the desired incandescence. Another and most important fact which he demonstrated was the practicability of using tubes of rarified gas without any terminals as practical sources of illumination by simply creating an electrostatic field near them, and also of using lamps without leading-in wires. All these results can evidently only be obtained by the use of enormous frequencies and potentials, or, in other words, powerful electrostatic effects, the study of which was made difficult in consequence of the fact that in previous experiments, looking to this end, the static effects were excessively small, owing to the fact that the coil was short-circuited through the low resistance discharge between the knobs of the discharger. The method of conversion devised by Mr. Tesla, allowing of the use of any frequency, enables us to undertake a much more exact and easy study of the effects of short waves. Again, his experiments with the lamps burning when connected with their terminals to a short, thick copper bar, are extremely interesting. The possibility of verifying nodes on the bar by simply using a Cardew voltmeter will be of great value in investigating these phenomena. His experiments also prove that while, with alternating currents of low frequency, such as are now generally employed, the effects of self-induction must be largely considered, those of high frequency accentuate largely the condenser effects which have to be allowed for accordingly.

It would lead us too far to enter into all of the numerous points suggested by Mr. Tesla's lecture, but he showed enough to warrant the assertion that in a comparatively short time the practical application of these principles to the production of artificial illumination will be an accomplished fact.